

# APPENDIX K

## HEALTH AND SAFETY PLAN

### BASIS OF DESIGN REPORT

### JORGENSEN FORGE EARLY ACTION AREA

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**Prepared for**

U.S. Environmental Protection Agency  
Region 10  
1200 Sixth Avenue  
Seattle, Washington 98101

**On behalf of**

Earle M. Jorgensen Company  
10650 South Alameda Street  
Lynwood, California 90262

Jorgensen Forge Corporation  
8531 East Marginal Way South  
Seattle, Washington 98108

**Prepared by**

Anchor QEA, LLC  
720 Olive Way, Suite 1900  
Seattle, Washington 98101

**March 2013**

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## CERTIFICATION PAGE

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David Templeton

Project Manager

Corporate Health and Safety Manager

Anchor QEA, LLC

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Ryan Barth

Field Lead

Anchor QEA, LLC

Date: \_\_\_\_\_

Date: \_\_\_\_\_

The information in this Health and Safety Plan has been designed for the Statement of Work for the removal action implementation for the Jorgensen Forge EAA, U.S. Environmental Protection Agency (EPA) Docket No. CERCLA-10-2013-0032 located within the Lower Duwamish Waterway (LDW) Superfund Site. Therefore, this document may not be appropriate if the work is not performed by or using the methods presently contemplated by Anchor QEA. In addition, as the work is performed, conditions different from those anticipated may be encountered and this document may have to be modified. Therefore, Anchor QEA only intends this plan to address currently anticipated activities and conditions and makes no representations or warranties as to the adequacy of the Health and Safety Plan for all conditions encountered.

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## HEALTH AND SAFETY PLAN ACKNOWLEDGEMENT FORM

Project Number: 08224-01.02      Project Name: Jorgensen Forge Early Action Area

My signature below certifies that I have read and understand the policies and procedures specified in this Health and Safety Plan (HASP). For non-Anchor QEA employees, this HASP may include company-specific appendices to this plan developed by entities other than Anchor QEA.

Date	Name (print)	Signature	Company

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[illegible]



## LIABILITY WAIVER

### Release from Liability, Waiver of Claims, and Indemnification – Non-Anchor QEA Employees and Subcontractors

This liability release, waiver, and indemnification is required for participation in our field trips and site tours. Each participant must sign his/her own form.

In return for receiving permission from **Anchor QEA, LLC**, a Washington State limited liability corporation ("**Anchor QEA**") to participate in the field trip which is to take place at \_\_\_\_\_ (location) on \_\_\_\_\_ (date) (collectively, the "**Activities**"), the undersigned participant ("**Participant**"), acting through and/or with the consent of his/her parent or legal guardian (if Participant is a minor or the subject of a guardianship), hereby agrees as follows:

1. I fully recognize the dangers of participating in the Activities, and I voluntarily assume all risks associated with my participation in the Activities. I understand that the dangers which I may encounter at the site(s) where the Activities take place (in each case, a "**Site**") include, by way of example only and without limitation: exposure to contaminants; exposure to aerosol vapors; wild animals, poisonous snakes, and harmful insects; poisonous vegetation; drowning, sea sickness and boating accidents; falling from steep slopes, cliffs or narrow trails; landslides; rough terrain; lightning; wildfire; extremes of temperatures; and storms. I realize that there is also a risk of my becoming seriously ill or injured in an area remote from medical care and that Anchor QEA cannot guarantee the availability of emergency medical services or emergency transportation to medical facilities.
2. I agree that neither Anchor QEA nor any of its agents, representatives, partners, contractors, consultants or employees: a) shall have any liability for any defect or dangerous natural or artificial condition relating to any Site or any of the Activities; or b) have made or are making any representation or warranty, expressed or implied, regarding: i) the conditions of any Site; ii) the safety of the Activities or any of the equipment to be used in connection with the Activities; iii) any means of transportation to or from any Site; or iv) any other aspect of any Site or any of the Activities.

3. I agree to take the responsibility to familiarize myself with the rules and regulations applicable to the Sites and the Activities, and to ensure that I have been properly instructed in and understand the use of any equipment I am to use in the Activities. I realize that my participation in the Activities may require sustained strenuous physical activity. I am in good health, and am not aware of any physical or medical condition that might endanger myself or other participants in the Activities.
4. Acting for myself and my heirs, executors, personal representatives and assigns, I forever release and discharge Anchor QEA and its owners, employees, agents, officers, and directors, and the successors and assigns of each of them (in each case, a **"Released Party"**), of and from all claims, losses, damages, costs, expenses and other liabilities, including (but not limited to) reasonable attorneys' fees (in each case, a **"Claim"**), whether known or unknown, foreseen or unforeseen, relating to property damage or the death, injury, pain, or mental trauma of myself or any other person, and resulting, directly or indirectly, from my participation in the Activities or my travel to or from any Site. Without limiting the above, I agree not to sue any of the Released Parties for any such Claims, to waive any such Claims which I may have at any time against any of the Released Parties, and to indemnify and defend each of the Released Parties against, and to hold each of the Released Parties harmless of and from any Claims resulting from my acts or omissions during the Activities or while at any Site.
5. I have read and understand the policies and procedures specified in the Health and Safety Plan (HASP) for this site. This HASP may include company-specific appendices developed by entities other than Anchor QEA.

The undersigned Participant acknowledges and agrees that he/she has carefully read this Release from Liability, Waiver of Claims, and Indemnification and fully understands all of its contents, and their legal effect, and agrees that this Release from Liability, Waiver of Claims, and Indemnification (of which I have been given a copy to keep, with any attachments) is contractually binding, and is being signed by the undersigned Participant of his/her own free will.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name: \_\_\_\_\_ Email: \_\_\_\_\_

Address: \_\_\_\_\_

(street address – no PO Boxes)

City: \_\_\_\_\_ State: \_\_\_\_\_ ZIP: \_\_\_\_\_

Phone Number: \_\_\_\_\_

Emergency Contact: \_\_\_\_\_

Contact's Phone Number: \_\_\_\_\_

### **Consent and Release for Publications of Photographs**

I, the undersigned, hereby grant Anchor QEA permission to take photographs of me, and irrevocably consent to and authorize the use and reproduction by Anchor QEA, or anyone duly authorized by Anchor QEA, of any and all such photographs, for any legitimate purposes, including for advertising, trade, and editorial purposes, at any time in the future in all media now known or hereafter developed, throughout the world. I also consent to the use of my name in connection with such photos.

I hereby release, indemnify, and hold harmless Anchor QEA and its owners, officers, directors, agents, and employees from any and all claims which may result at any time by reason of the use of my image and name, including, without limitation, claims of privacy. My heirs, executors, administrators, and assigns shall be bound by this consent and release. I am over the age of 18.

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Printed Name: \_\_\_\_\_

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## SITE EMERGENCY PROCEDURES

### Site Map

The following figure provides an overview of the general site location.



**Figure A**  
**General Site Location Overview**

## Emergency Contact Information

**Table A**  
**Site Emergency Form and Emergency Phone Numbers\***

Category	Information
Possible Chemicals of Concern	Polychlorinated biphenyls (PCBs), metals, semivolatile organic compounds (SVOCs)
Minimum Level of Protection	D
Site(s) Location Address	Jorgensen Forge Corporation 8531 East Marginal Way South Tukwila, Washington 98108
<b>Emergency Phone Numbers</b>	
Ambulance	911 [American Medical Response (206) 444-4440]
Fire	911 [Tukwila Fire Department (206) 575-4404]
Police	911 [Tukwila Police Department (206) 433-1808]
Poison Control	1-800-222-1212
Facility Contact	John P. Gross      Office: (206) 965-1352 Cell: (206) 920-9653
Project Manager (PM)	David Templeton      Office: (206) 287-9130 Cell: (206) 910-4279
Field Lead (FL)	Ryan Barth      Office: (206) 287-9130 Cell: (206)-719-3605
Corporate Health and Safety Manager (CHSM)	David Templeton      Office: (206) 287-9130 Cell: (206) 910-4279
Seattle Harbor Patrol	(206) 684-4071
USCG Puget Sound Sector	(206) 217-6001
South Park Marina 8604 Dallas Ave South Seattle WA 98108	(206) 762-3880
National Response Center	1-800-424-8802
Local Emergency Response System	City of Tukwila Emergency Management (206) 971-8740
EPA Environmental Response Team	1-201-321-6600













\* In the event of any emergency, contact the PM and FL.

## Hospital Route Map and Driving Directions

**Table B**  
**Hospital Information**

Category	Information
Hospital Name	Valley Medical Center
Address	400 South 43rd Street
City, State	Renton, Washington 98055
Phone	(425)228-3450
Emergency Phone	911

Starting point: **8531 E Marginal Way S, Seattle, WA 98108**

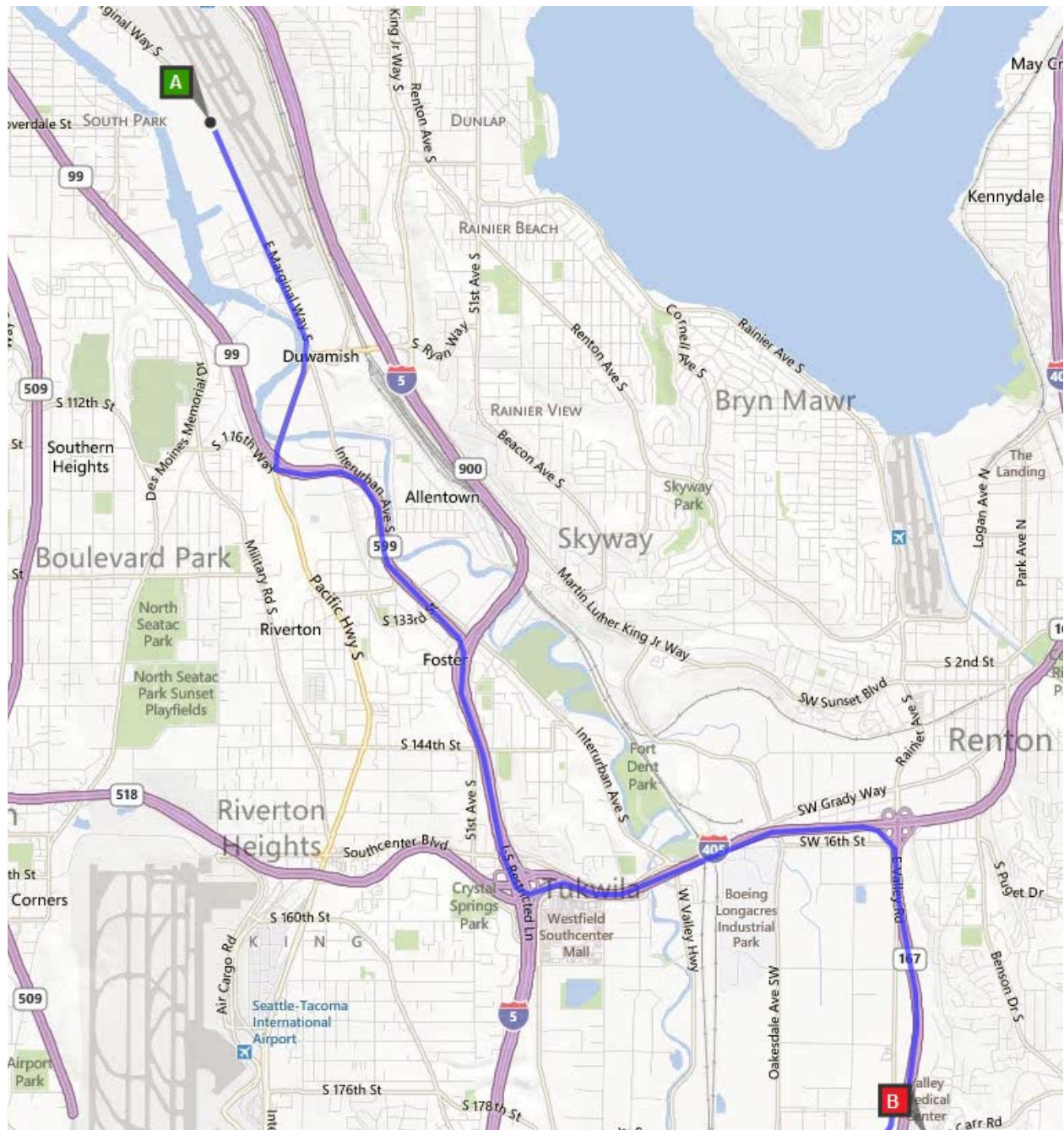
1. Depart E Marginal Way S toward S 87th Pl (1.4 miles)
2.  Keep right to stay on E Marginal Way S (266 feet)
3.  Bear right onto Pacific Hwy S / Tukwila International Blvd (0.6 miles)
4.  Keep straight onto WA-99 / Pacific Hwy S / Tukwila International Blvd (436 feet)
5.  Take ramp left for WA-599 S (1.7 miles)
6.  Take ramp and follow signs for I-5 South (0.4 miles)
7.  Keep right onto I-5 S (1.0 miles)
8.  At exit 154A, take ramp left for I-405 North toward Renton (2.0 miles)
9.  At exit 2, take ramp right for WA-167 South toward Kent / Auburn (1.9 miles)
10.  Take ramp right for E Valley Rd toward S W 43rd St (0.1 miles)
11.  Turn left onto E Valley Rd (0.2 miles)
12.  Turn left onto S 180th St (0.2 miles)
13.  Road name changes to S 43rd St (344 feet)
14. Arrive at 400 S 43rd St, Renton, WA 98055

The last intersection is Davis Ave S.

If you reach Talbot Rd S, you've gone too far



## Hospital Route Map and Driving Directions



**Figure B**  
**Hospital Route Map**

## Key Safety Personnel

The following people share responsibility for health and safety at the site. See Section 4 of this HASP for a description of the role and responsibility of each.

Facility Contact: John P. Gross	Office: (206) 965-1352 Cell: (206) 920-9653
Project Manager (PM): David Templeton	Office: (206) 287-9130 Cell: (206) 910-4279
Field Lead (FL): Ryan Barth	Office: (206) 287-9130 Cell: (206)-719-3605
Corporate Health and Safety Manager (CHSM): David Templeton	Office: (206) 287-9130 Cell: (206) 910-4279

## Emergency Response Procedures

In the event of an emergency, immediate action must be taken by the first person to recognize the event. Use the following steps as a guideline:

- Survey the situation to ensure that it is safe for you and the victim. Do not endanger your own life. Do not enter an area to rescue someone who has been overcome unless properly equipped and trained. Ensure that all protocols are followed. If applicable, review Material Safety Data Sheets (MSDS) to evaluate response actions for chemical exposures.
- Call the appropriate emergency number (911; if available) or direct someone else to do this immediately (see Table A). Explain the physical injury, chemical exposure, fire, or release and location of the incident.
- Have someone retrieve the nearest first aid kit and Automatic External Defibrillator (AED), if available. Note: only use an AED if you have been properly trained and are currently certified to do so.
- Decontaminate the victim without delaying life-saving procedures (see Section 8).
- Administer first aid and cardiopulmonary resuscitation (CPR), if properly trained, until emergency responders arrive.
- Notify the Project Manager (PM), Field Lead (FL), and owner.
- Complete the appropriate incident investigation reports.



## **First Aid and CPR Guidelines**

Personnel qualified and current in basic first aid and/or CPR procedures may perform those procedures as necessary. Personnel qualified and current in basic first aid and/or CPR are protected under Good Samaritan policies as long as they only perform the basic tasks that they were taught. Do not perform first aid and/or CPR tasks if you have not been trained in first aid and/or CPR.

## **Injury Management/Incident Notification**

Observe the following injury management/incident notification procedures and practices:

### ***Injury Management***

- Once a personal injury incident is discovered, the first action will be to ensure that the injured party receives appropriate medical attention.
- If it is safe to do so, the nearest workers will immediately assist a person who shows signs of medical distress or who is involved in an accident.
- Render first aid and call 911 or the appropriate emergency number as soon as possible.
- Escort the injured person to the occupational clinic or hospital or arrange for an ambulance.
- Proceed immediately to Notification Requirements, below.

### ***Notification Requirements***

- Directly after caring for an injured person, the FL will be summoned. The FL will immediately make contact with the PM or other designated individual to alert them of the medical emergency. The FL will advise them of the following:
  - Location of the victim at the work site
  - Nature of the emergency
  - Whether the victim is conscious
  - Specific conditions contributing to the injury, if known
- Contact the PM (if not contacted previously) immediately.

- The PM will contact upper line management, and client representative(s) including the Corporate Health and Safety Manager (CHSM).
- The CHSM will facilitate the incident investigation.

All client requirements will also be adhered to pertinent to personal injury incident reporting.

### ***Incident Other Than Personal Injury***

All incidents including, but not limited to, fire, explosion, property damage, or environmental release will be responded to in accordance with the site-specific HASP. In general, this includes securing the site appropriate to the incident, turning control over to the emergency responders, or securing the site and summoning appropriate remedial personnel or equipment. Anchor QEA will immediately notify the client of any major incident, fire, equipment or property damage, or environmental incident with a preliminary report. A full report will be provided within 72 hours.

### ***Near-Miss Reporting***

All near-miss incidents (those that could have reasonably lead to an injury, environmental release, or other incident) must also be reported to the FL and/or PM immediately so they can take action to ensure that such conditions that lead to the near-miss incident can be readily corrected in order to prevent future occurrences.

### ***Spills and Releases of Hazardous Materials***

When required, notify the National Response Center and local state agencies. The following information should be provided to the National Response Center:

- Name and telephone number
- Name and address of facility
- Time and type of incident
- Name and quantity of materials involved, if known
- Extent of injuries
- Possible hazards to human health or the environment outside of the facility

The emergency telephone number for the National Response Center is 1-800-424-8802. If hazardous waste has been released or produced through control of the incident, ensure that:

- Waste is collected and contained
- Containers of waste are removed or isolated from the immediate site of the emergency
- Treatment or storage of the recovered waste, contaminated soil or surface water, or any other material that results from the incident or its control is provided
- No waste that is incompatible with released material is treated or stored in the facility until cleanup procedures are completed

Ensure that all emergency equipment used is decontaminated, recharged, and fit for its intended use before operations are resumed.

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- Attachment 2 Job Safety Analysis (JSA) Documents
- Attachment 3 Material Safety Data Sheets (MSDS)

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## LIST OF ACRONYMS AND ABBREVIATIONS

° C	degrees Celsius
° F	degrees Fahrenheit
ACGIH	American Conference of Governmental Industrial Hygienists
AED	Automated External Defibrillator
Anchor QEA	Anchor QEA, LLC
ANSI	American National Standards Institute
AOC	Administrative Settlement Agreement and Order on Consent
APR	Air-Purifying Respirator
ASTM	ASTM International
CFR	Code of Federal Regulations
CHSM	Corporate Health and Safety Manager
COC	chemical of concern
CPR	Cardiopulmonary resuscitation
CRZ	Contamination Reduction Zone
dbA	A-weighted decibel
dB	decibel
DOT	U.S. Department of Transportation
EAA	Early Action Area
EPA	U.S. Environmental Protection Agency
eV	electron volts
EZ	Exclusion Zone/Hot Zone
Facility	Jorgensen Forge facility
FL	Field Lead
GFCI	Ground Fault Circuit Interrupter
H:V	horizontal to vertical
HASP	Health and Safety Plan
HAZMAT	Hazardous Materials
HAZWOPER	Hazardous Waste Operations and Emergency Response
HEPA	High Efficiency Particulate Air
HMIS	Hazardous Material Information System



IP	Ionization Potential
Jorgensen Forge	Jorgensen Forge Corporation
Jorgensen Forge	Jorgensen Forge Early Action Area
EAA	
JSA	Job Safety Analysis
kV	kilovolts
LDW	Lower Duwamish Waterway
LEL	Lower Explosive Limit
LO/TO	Lock out/Tag out
mg/m <sup>3</sup>	Milligrams per cubic meter
MHR	Maximum Heart Rate
mph	miles per hour
MSDS	Material Safety Data Sheets
MUTCD	Manual of Uniform Traffic Control Devices
NEC	National Electrical Code
NFPA	National Fire Protection Association
NIOSH	National Institute for Occupational Safety and Health
NPL	National Priority List
NRR	Noise Reduction Rating
NTCRA	non-time critical removal action
OEL	Occupational Exposure Limit
OSHA	Occupational Safety and Health Act or Administration
OV	Organic Vapor
OVM	Organic Vapor Monitor
PAH	Polycyclic Aromatic Hydrocarbon
PCB	polychlorinated biphenyl
PEL	Permissible Exposure Limit
PFD	personal flotation device
PM	Project Manager
PPE	Personal Protective Equipment
REL	Recommended Exposure Limits
RCRA	Resource Conservation and Recovery Act
STEL	Short-term Exposure Limit

SVOC	semivolatile organic compound
SZ	Support Zone/Clean Zone
TLV	Threshold Limit Values
TSD	Treatment, Storage, and Disposal Facility
TWA	Time Weighted Average
TWIC	Transportation Worker Identification Credential
UL	Underwriters Laboratories Inc.
USCG	U.S. Coast Guard
VOC	Volatile organic compound
WBGT	Wet Bulb Globe Temperature

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## 1 INTRODUCTION

This Health and Safety Plan (HASP) has been prepared on behalf of the Jorgensen Forge Corporation (Jorgensen Forge) and presents the health and safety requirements and procedures that will be followed by Anchor QEA, LLC (Anchor QEA) personnel and at a minimum by its subcontractors during work activities during the Jorgensen Forge Early Action Area (EAA) non-time critical removal action (NTCRA; herein referred to as removal action) conducted on sediments and bank materials (the site) adjacent to the Jorgensen Forge facility (the Facility). This HASP has been developed in accordance with Title 29 of the Code of Federal Regulations (CFR), Part 1910.120(b), and will be used in conjunction with Anchor QEA's Corporate Health and Safety Program. See Section 1.1 for HASP modification procedures.

The provisions of this HASP are mandatory for all Anchor QEA personnel assigned to the project. Anchor QEA subcontractors are also expected to follow the provisions of this HASP unless they have their own HASP that covers their specific activities related to this project. Any subcontractor HASPs must, at a minimum, include the requirements set forth in this HASP. Construction contractors, and their subcontractors, will be required to develop separate HASPs. All visitors to the work site must also abide by the requirements of this HASP and will attend a pre-work briefing where the contents of this HASP will be presented and discussed.

Personnel assigned to work at the Jorgensen Forge EAA will be required to read this plan and must sign the HASP Acknowledgement Form to confirm that they understand and agree to abide by the provisions of the HASP.

Subcontractors are ultimately responsible for the health and safety of their employees. Subcontractors may mandate health and safety protection measures for their employees beyond the minimum requirements specified in this HASP.

The objectives of this HASP are to identify potential physical, chemical, and biological hazards associated with field activities; establish safe working conditions and protective measures to control those hazards; define emergency procedures; and describe the

responsibilities, training requirements, and medical monitoring requirements for site personnel.

This HASP prescribes the procedures that must be followed during specific site activities. Significant operational changes that could affect the health and safety of personnel, the community, or the environment will not be made without the prior approval of the Project Manager (PM) and the Corporate Health and Safety Manager (CHSM).

Issuance of this approved plan documents that the workplace has been evaluated for hazards. A hazard assessment has been performed and the adequacy of the personal protective equipment (PPE) selected was evaluated as required by 29 CFR 1910.132(d) - Personal Protective Equipment, General Requirements (general industry), 1910.134 - Respiratory Protection, 1926.28 - Personal Protective Equipment (construction industry), and 1926.55 - Gases, vapors, fumes, dusts and mist, and is duly noted by the signature(s) and date appearing on the certification page of this document.

## **1.1 Health and Safety Plan Modifications**

This HASP will be modified by amendment, if necessary, to address changing field conditions or additional work tasks not already described in this document. Modifications will be proposed by the Field Lead (FL) using the "Modification to Health and Safety Plan" form included in Attachment 1. Modifications will be reviewed by the CHSM or authorized representative and approved by the PM.

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## 2 SITE DESCRIPTION/BACKGROUND INFORMATION

### 2.1 Site Description

The Facility occupies approximately 20 acres at 8531 East Marginal Way South in Seattle, Washington, and is located directly adjacent sediments and bank materials subject to the removal action. The Facility contains an approximately 124,000-square-foot building of prefabricated steel that houses a Machine Shop Area, Forge Shop Area, Hollowbore Area, Melt Shop Area, Heat Treat Area, and Shipping Area (Figure A). The Facility also contains a building that houses an Aluminum Heat Treating Area and several smaller buildings used for offices, a metallurgical laboratory, and storage areas.

The Facility is currently used as a steel and aluminum forge that produces custom steel and aluminum parts forged and machined to high precision specifications for various industrial clients. The major operations conducted include:

- Melting scrap steel and forming the molten steel into ingots
- Forging the steel ingots into billets and/or shape forgings
- Heat-treating the forged steel and purchased aluminum products
- Grinding and machining the steel billets to required specifications
- Ring rolling and/or expanding the aluminum products to required specifications

Legacy contaminants of concern include polychlorinated biphenyls (PCBs), metals, and semivolatile organic compounds (SVOCs; contained in the footprint of the PCBs) found in sediments and on the shoreline adjacent to the Facility.

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### 3 SCOPE OF WORK

#### 3.1 Project Scope of Work

Currently, the site is subject to an Administrative Settlement Agreement and Order on Consent (AOC) for removal action implementation for the Jorgensen Forge EAA, U.S. Environmental Protection Agency (EPA) Docket No. CERCLA- 10-2013-0032 located within the Lower Duwamish Waterway (LDW) Superfund Site. The planned removal action consists of mechanical dredging of impacted sediments and bank reconfiguration. As part of the design and implementation of the removal action, the following potential field activities are addressed in concept by this HASP. Upon finalization of specific work tasks, task-specific Job Safety Analyses (JSAs) will be completed and added to the HASP (JSAs are discussed in more detail in Section 6.1).

- Pre-design field activities
- Sediment, surface water, or soil sampling activities
- Non-invasive assessments (bathymetric surveys, habitat inspections)
- Construction observation
- Water quality monitoring activities
- Sediment confirmatory sampling

As previously stated, the HASP addresses these potential work tasks in concept and provides information and procedures that assume a general approach to these tasks, based on Anchor QEA experience conducting similar tasks at multiple sediment cleanup sites. Specific data, where available (such as chemicals of concern [COCs]), are included in the HASP.

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## **4 AUTHORITY AND RESPONSIBILITIES OF KEY PERSONNEL**

This section describes the authority and responsibilities of key Anchor QEA project personnel. The names and contact information for the following key safety personnel are listed in the Emergency Site Procedures section at the beginning of this HASP. Should key site personnel change during the course of the project, a new list will be established and posted immediately at the site. The emergency phone number for the site is **911**, and should be used for all medical, fire, and police emergencies.

### **4.1 Project Manager**

The PM provides overall direction for the project. The PM is responsible for ensuring that the project meets the client's objectives in a safe and timely manner. The PM is responsible for providing qualified staff for the project and adequate resources and budget for the health and safety staff to carry out their responsibilities during the field work. The PM will be in regular contact with the FL and CHSM to ensure that appropriate health and safety procedures are implemented into each project task.

The PM has authority to direct response operations; the PM assumes total control over project activities but may assign responsibility for aspects of the project to others. In addition, the PM:

- Oversees the preparation and organization of background review of the project, the work plan, and the field team.
- Ensures that the team obtains permission for site access and coordinates activities with appropriate officials.
- Briefs the FL and field personnel on specific assignments.
- Together with the FL, sees that health and safety requirements are met.
- Consults with the CHSM regarding unsafe conditions, incidents, or changes in site conditions or the Statement of Work.

### **4.2 Field Lead**

The FL reports to the PM, has authority to direct response operations, and assumes control over on-site activities. The FL will direct field activities, coordinate the technical and health

and safety components of the field program, and is responsible in general for enforcing this site-specific HASP and Corporate Health and Safety Program requirements. The FL will be the primary point of contact for all field personnel and visitors and has direct responsibility for implementation and administration of this HASP. The FL and any other member of the field crew have **STOP WORK AUTHORITY** - the authority to stop or suspend work in the event of an emergency, if conditions arise that pose an unacceptable health and safety risk to the field crew or environment, or if conditions arise that warrant revision or amendment of this HASP. The following include, but are not necessarily limited to, the functions of the FL related to this HASP:

- Conduct and document daily safety meetings, or designate an alternate FL in his or her absence.
- Execute the work plan and schedule.
- Conduct periodic field health and safety inspections to ensure compliance with this HASP.
- Oversee implementation of safety procedures.
- Implement worker protection levels.
- Enforce site control measures to ensure that only authorized personnel are allowed on site.
- Notify, when necessary, local public emergency officials (all personnel on site may conduct this task as needed).
- Follow-up on incident reports to the PM.
- Periodically inspect protective clothing and equipment for adequacy and safety compliance.
- Ensure that protective clothing and equipment are properly stored and maintained.
- Perform or oversee air monitoring in accordance with this HASP.
- Maintain and oversee operation of monitoring equipment and interpretation of data from the monitoring equipment.
- Monitor workers for signs of stress, including heat stress, cold exposure, and fatigue.
- Require participants to use the “buddy” system.
- Provide (via implementation of this HASP) emergency procedures, evacuation routes, and telephone numbers of the local hospital, poison control center, fire department, and police department.
- Communicate incidents promptly to the PM.



- Maintain communication with the CHSM on site activities.
- If applicable, ensure that decontamination and disposal procedures are followed.
- Maintain the availability of required safety equipment.
- Advise appropriate health services and medical personnel of potential exposures.
- Notify emergency response personnel in the event of an emergency and coordinate emergency medical care.

The FL will record health-and-safety-related details of the project in the field logbook. At a minimum, each day's entries must include the following information:

- Project name or location
- Names of all on-site personnel
- Level of PPE worn and any other specifics regarding PPE
- Weather conditions
- Type of field work being performed

The FL will have completed the required Occupational Safety and Health Administration (OSHA) 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training and annual updates, the 8-hour Supervisor training, medical monitoring clearance, and current first aid and cardiopulmonary resuscitation (CPR) training. Other certifications or training may be stipulated based on client or site requirements.

### **4.3 Corporate Health and Safety Manager**

The CHSM (or his/her designee) will be responsible for managing on-site health and safety activities and will provide support to the PM and FL on health and safety issues. The specific duties of the CHSM are to:

- Provide technical input into the design and implementation of this HASP.
- Advise on the potential for occupational exposure to project hazards, along with appropriate methods and/or controls to eliminate site hazards.
- Ensure that a hazard assessment has been performed and that the adequacy of the PPE selected was evaluated as required by 29 CFR 1910.132(d), 1910.134, 1926.25, and 1926.55, and is duly noted by the signatures and date appearing on the Certification Page of this document.

- Consult with the FL on matters relating to suspending site activities in the event of an emergency.
- Verify that all on-site Anchor QEA personnel and subcontractors have read and signed the HASP Acknowledgement Form.
- Verify that corrective actions resulting from deficiencies identified by audit and observations are implemented and effective.

The CHSM will have completed the required OSHA 40-hour HAZWOPER training and annual updates, the 8-hour Supervisor training, and have medical monitoring clearance. In addition, the CHSM (or his/her designee) will have current training in first aid and CPR.

#### **4.4 Project Field Team**

All project field team members will attend a project-specific meeting conducted by the FL concerning safety issues and project work task review before beginning work. All field crew, including subcontractors, must be familiar with and comply with this HASP. The field crew has the responsibility to immediately report any potentially unsafe or hazardous conditions to the FL, and all members of the field crew have **STOP WORK AUTHORITY** - the authority to stop or suspend work if conditions arise that pose an unacceptable health and safety risk to the field crew or environment, or if conditions arise that warrant revision or amendment of this HASP. The field team reports to the FL for on-site activities and is responsible for:

- Reviewing and maintaining a working knowledge of this HASP
- Safe completion of on-site tasks required to fulfill the work plan
- Compliance with the HASP
- Attendance and participation in daily safety meetings
- Notification to the FL of existing or potential safety conditions at the site
- Reporting all incidents to the FL
- Demonstrating safety and health conscious conduct

Per OSHA 1910.120(e)(3)(i)<sup>1</sup>, newly assigned HAZWOPER 40-hour trained field team members must have at least 3 days of field work supervised by an experienced FL (preferably an individual with HAZWOPER Supervisor training). It is the responsibility of the PM to identify such “short service” personnel and ensure that their supervised field experience occurs (or has occurred) and is documented in the project field notes and on the Daily Safety Briefing form (provided in Attachment 1).

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<sup>1</sup> “General site workers (such as equipment operators, general laborers and supervisory personnel) engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances and health hazards shall receive a minimum of 40 hours of instruction off the site, and a minimum of three days actual field experience under the direct supervision of a trained experienced supervisor.”

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## **5 PROJECT-SPECIFIC REQUIREMENTS**

This section provides activity-specific levels of protection and air monitoring requirements to be used on this site based on the Statement of Work and the COCs.

### **5.1 Activity-Specific Level of Protection Requirements**

Refer to Section 10 of this HASP for general requirements for PPE. Level D is the minimum acceptable level for most sites. An upgrade to Modified Level D occurs when there is a possibility that contaminated media can come in contact with the skin or work uniform. An upgrade to Level C occurs when there is a potential for exposure to airborne COCs (i.e., if the results of air monitoring reveal that action levels have been exceeded). Hearing protection must be worn when there are high noise levels. Workers must maintain proficiency in the use and care of PPE that is to be worn.

It is assumed at this time that only Level D and Modified Level D will be required for on-site work. If conditions or requirements dictate the need for Level C or higher, this HASP will be amended accordingly.

Table 5-1, Project Job Tasks and Required PPE, describes the specific means of protection needed for potential work activities.

### **5.2 Project Air Monitoring Requirements**

It is assumed at this time that only Level D and Modified Level D will be required for on-site work and, accordingly, air monitoring is not required. As such, if conditions or requirements dictate the need for air monitoring, this HASP will be amended accordingly.

**Table 5-1**  
**Project Job Tasks and Required PPE**

Job Tasks	PPE Requirements
<ul style="list-style-type: none"> <li>Construction observation, site visits, activities where proximity to chemicals of concern is unlikely</li> </ul>	<input type="checkbox"/> Standard work uniform/coveralls
	<input checked="" type="checkbox"/> Work boots with safety toe conforming to ASTM International (ASTM) (ASTM) F2412-05/ASTM F2413-05
	<input checked="" type="checkbox"/> Traffic Safety Vest
	Chemical-resistant clothing <u>check appropriate garments</u> : <input type="checkbox"/> One-piece coverall <input type="checkbox"/> Hooded one- or two-piece chemical splash suit <input type="checkbox"/> Disposable chemical coveralls <input type="checkbox"/> Chemical-resistant hood and apron <input type="checkbox"/> Bib-style overalls and jacket with hood
	<input type="checkbox"/> <b>Fabric Type:</b> Tyvek NOTE: Thick rain pants and coveralls may be substituted for coated Tyvek if sediments are not obviously contaminated with polycyclic aromatic hydrocarbons (PAHs) or related petroleum products. Rain slickers cannot be effectively decontaminated of tar/petroleum contamination.
	<input type="checkbox"/> Disposable inner gloves (surgical)
	<input type="checkbox"/> Disposable chemical-resistant outer gloves <b>Material Type:</b> Nitrile
	<input checked="" type="checkbox"/> If chemical hazards are present, chemical-resistant boots with safety toe and steel shank conforming to ASTM F2412-05/ASTM F2413-05 or disposable boot covers for safety toe/work boots <b>Material Type:</b> Non-absorptive
	<input type="checkbox"/> Sleeves to be duct-taped over gloves and pants to be duct-taped over boots
	<input type="checkbox"/> Splash-proof safety goggles
	<input checked="" type="checkbox"/> Safety glasses
	<input checked="" type="checkbox"/> Hard hat
	<input type="checkbox"/> Hard hat with face shield
	<input type="checkbox"/> Hearing protectors ( <b>REQUIRED</b> if site noise levels are greater than 85 decibels [dB] based on an 8-hour time-weighted average [TWA]). <b>Type:</b>
	<input type="checkbox"/> Two-way radio communication (intrinsically safe, if explosive atmosphere is a potential)
	<input type="checkbox"/> Long cotton underwear
	<input checked="" type="checkbox"/> Orange, U.S. Coast Guard (USCG)-approved personal flotation device (PFD)

Job Tasks		PPE Requirements
	<input checked="" type="checkbox"/>	USCG-approved float coat and bib-overalls (e.g., full two-piece “Mustang” survival suit or similar) or one-piece survival suit if combined air and water temperature is below 90° F
	<input type="checkbox"/>	Half-face Air-Purifying Respirator (APR) (OSHA/ National Institute for Occupational Safety and Health [NIOSH]-approved)
	<input type="checkbox"/>	Full-face APR (OSHA/NIOSH-approved)
	<input type="checkbox"/>	<b>Type of Cartridges to be Used:</b> <input type="checkbox"/> OV (organic vapor) or <input type="checkbox"/> OV/HEPA (if samples are dry)
Sampling or Survey Activities <sup>2</sup> – sediment coring, surface water sampling, habitat surveys, water quality monitoring, etc.	<input type="checkbox"/>	Standard work uniform/coveralls
	<input type="checkbox"/>	Work boots with safety toe conforming to ASTM F2412-05/ASTM F2413-05
	<input checked="" type="checkbox"/>	Traffic Safety Vest
	<input checked="" type="checkbox"/>	Chemical-resistant clothing <u>check appropriate garments:</u> <input checked="" type="checkbox"/> One-piece coverall <input type="checkbox"/> Hooded one- or two-piece chemical splash suit <input type="checkbox"/> Disposable chemical coveralls <input type="checkbox"/> Chemical-resistant hood and apron <input type="checkbox"/> Bib-style overalls and jacket with hood
	<input checked="" type="checkbox"/>	<b>Fabric Type:</b> Tyvek NOTE: Thick rain pants and coveralls may be substituted for coated Tyvek if sediments are not obviously contaminated with PAHs or related petroleum products. Rain slickers cannot be effectively decontaminated of tar/petroleum contamination.
	<input checked="" type="checkbox"/>	Disposable inner gloves (latex or equivalent “surgical”)
	<input checked="" type="checkbox"/>	Disposable chemical-resistant outer gloves <b>Material Type:</b> Nitrile
	<input checked="" type="checkbox"/>	If chemical hazards are present chemical-resistant boots with safety toe and steel shank conforming to ASTM F2412-05/ASTM F2413-05 or disposable boot covers for safety toe/work boots <b>Material Type:</b> Non-absorptive
	<input type="checkbox"/>	Sleeves to be duct-taped over gloves and pants to be duct-taped over boots
	<input type="checkbox"/>	Splash-proof safety goggles
	<input checked="" type="checkbox"/>	Safety glasses
	<input checked="" type="checkbox"/>	Hard hat

<sup>2</sup> Please refer to JSAs for task-specific PPE requirements. The PPE requirements provided in this table are default for potential sampling or survey activities.

Job Tasks		PPE Requirements
	<input type="checkbox"/>	Hard hat with face shield
	<input checked="" type="checkbox"/>	Hearing protectors ( <b>REQUIRED</b> if site noise levels are greater than 85 dB based on an 8-hour TWA). <b>Type:</b> Varies
	<input type="checkbox"/>	Two-way radio communication (intrinsically safe, if explosive atmosphere is a potential)
	<input type="checkbox"/>	Long cotton underwear
	<input checked="" type="checkbox"/>	Orange, USCG-approved PFD
	<input checked="" type="checkbox"/>	USCG-approved float coat and bib-overalls (e.g., full two-piece “Mustang” survival suit or similar) or one-piece survival suit if combined air and water temperature is below 90° F
	<input type="checkbox"/>	Half-face APR (OSHA/NIOSH-approved)
	<input type="checkbox"/>	Full-face APR (OSHA/NIOSH-approved)
	<input type="checkbox"/>	<b>Type of Cartridges to be Used:</b> <input type="checkbox"/> OV or <input type="checkbox"/> OV/HEPA (if samples are dry)

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## **6 RISK ANALYSIS AND CONTROL**

The following sections discuss the potential worker health and safety hazards associated with potential field tasks for this project. These hazards are addressed through the mechanical and physical control measures, use of PPE, monitoring, training, decontamination, emergency response, and safety procedures.

Significant changes in the scope of work covered by this HASP must be communicated to the PM and CHSM, and an amendment to this HASP must be created as needed (see Section 1.1). Any task conducted beyond those identified in the scope of work and this HASP must be evaluated using the JSA process prior to conducting the work.

### **6.1 Job Safety Analysis**

As specific work tasks are identified and designed, JSA documents will be developed that detail the chemical, physical, and biological hazards associated with these tasks, along with the specific control measures (e.g., engineering controls, administrative controls, and/or PPE) that will be used to ensure that these tasks are conducted in a safe manner.

The PM and FL are responsible for identifying work tasks and project site conditions that are beyond the previously developed JSA documents and for communicating such information to the CHSM. The CHSM will provide support, as needed, to the PM and/or the FL, who will have primary responsibility to develop project-specific JSAs.

The contents of the JSA documents shall be communicated to project personnel during the site orientation meeting and during daily safety meetings when conducting work where the specific JSAs are applicable.

A JSA template document is located in Attachment 2 of this HASP.

#### **6.1.1 Augmented JSA Process**

If significant work tasks are identified during the course of the project that were not previously addressed in the current JSA documentation at that time, then a task-specific JSA document must be developed at the project site prior to conducting the work. The PM



and/or FL shall develop this document(s) with input from the CHSM, as needed, and this HASP will be amended to include the document (see Section 1.1 for HASP modification procedures). Project personnel shall be trained on the contents of the developed task-specific JSA prior to its implementation. A copy of the task-specific JSA form used in this process is supplied in Attachment 2 of this HASP.

## **6.2 Exposure Routes**

Possible routes of exposure to the chemicals potentially encountered on this project include inhalation, dermal contact, and ingestion of dust, mist, gas, vapor, or liquid. Exposure will be minimized by using safe work practices and by wearing the appropriate PPE. A further discussion of PPE requirements is presented in Section 10.

### **6.2.1 Inhalation**

Inhalation of particulates, dust, mist, gas, or vapor during field activities is possible. Whenever possible, work activities will be oriented so that personnel are upwind of the sampling location. An organic vapor monitor (OVM) may be used to monitor ambient air and the breathing zone within the work area for organic compounds. The need for and details of task-specific air monitoring will be evaluated during identification and design of specific tasks.

### **6.2.2 Dermal Contact**

Dermal contact with potentially contaminated soil, sediment, or surface water during field activities is possible. Direct contact will be minimized through the use of appropriate PPE and decontamination procedures.

### **6.2.3 Ingestion**

Direct ingestion of contaminants can occur by inhaling airborne dust, mist, or vapors, or by swallowing contaminants trapped in the upper respiratory tract. Indirect ingestion can occur by introducing the contaminants into the mouth by way of food, tobacco, fingers, or other carriers. Although ingestion of contaminants can occur, proper hygiene, decontamination,

and contamination reduction procedures should reduce the probability of this route of exposure.

### **6.3 Chemicals of Concern Profile**

The following table provides a summary profile for the COCs for this project. As available, this profile is based on recent site history and site characterization information. For more detailed and specific information, always refer to the Material Safety Data Sheet (MSDS) or equivalent information for the chemical (see Attachment 3).

**Table 6-1**  
**Chemicals of Concern Profile**

<b>Chemical</b>	<b>Exposure Routes, Symptoms, Target Organs<sup>1</sup></b>	<b>TWA<sup>1</sup></b>	<b>STEL<sup>1</sup></b>	<b>Odor Threshold<sup>1</sup></b>	<b>LEL (%)<sup>1</sup></b>
PCBs (chlorodiphenyl at 54% chlorine)	<ul style="list-style-type: none"> <li>• Inhalation, absorption, ingestion, contact</li> <li>• Irritant to eyes, chloracne, liver damage, reproductive effects (potential occupational carcinogen)</li> <li>• Skin, eyes, liver, reproductive system</li> </ul>	0.001 mg/m <sup>3</sup>	--	-- (hydrocarbon odor)	--
PAHs (as benzo(a)pyrene)	<ul style="list-style-type: none"> <li>• Inhalation, contact</li> <li>• Dermatitis, bronchitis [potential occupational carcinogen]</li> <li>• Respiratory system, skin, bladder, kidneys (lung, kidney, and skin cancer)</li> </ul>	0.1 mg/m <sup>3</sup>	--	-- (slightly aromatic)	--
Metals (as mercury [inorganic])	<ul style="list-style-type: none"> <li>• Inhalation, absorption, ingestion, contact</li> <li>• Irritant to eyes and skin, cough, chest pain, difficulty breathing, bronchitis, pneumonia, tremors, insomnia, irritability, indecision, headache, lassitude, stomatitis, salivation, gastrointestinal disturbance, anorexia, weight loss, proteinuria</li> <li>• Eyes, skin, respiratory system, central nervous system, kidneys</li> </ul>	0.025 mg/m <sup>3</sup>	--	--	--

## Notes:

1 = NIOSH Pocket Guide to Chemical Hazards (NIOSH September 2007), cross referenced to TLVs and BEIs (ACGIH 2012)

eV = electron volts

IP = Ionization Potential

LEL = Lower Explosive Limit

mg/m<sup>3</sup> = milligrams per cubic meter

OEL = Occupational Exposure Limit (identifies the most restrictive exposure limit, e.g., federal or state OSHA permissible exposure limit (PEL), American Conference of Governmental Industrial Hygienists (ACGIH) threshold limit values (TLV), and/or National Institute for Occupational Safety and Health (NIOSH) recommended exposure limit (REL) for the chemicals of concern.

STEL = Short-term exposure limit

-- = no value or not applicable

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## 7 SITE CONTROL AND COMMUNICATIONS

The primary purposes for site controls are to establish the hazardous area perimeter, to reduce migration of contaminants into clean areas, and to prevent unauthorized access or exposure to hazardous materials by site personnel and the public. Site control is especially important in emergency situations.

### 7.1 General Site Control Safety Procedures

The following are standard safe work practices that apply to all Anchor QEA site personnel and subcontractors and shall be discussed in the safety briefing prior to initiating work on the site:

- Eating, drinking, chewing gum or tobacco, and smoking are prohibited on site except in designated areas.
- Hands and faces must be washed upon leaving the work area and before eating, drinking, chewing gum or tobacco, and smoking.
- A buddy system will be used. Radio or hand signals will be established to maintain communication.
- During site operations, each worker will consider him/herself as a safety backup to his/her partner.
- Visual contact will be maintained between buddies on-site when performing hazardous duties.
- No personnel will be admitted to the site without the proper safety equipment, training, and medical surveillance certification.
- All personnel must comply with established safety procedures. Any staff member who does not comply with safety policy, as established in this HASP, will be subject to corrective action, potentially including, but not limited to, reprimanded and immediate dismissal.
- Proper decontamination procedures must be followed before leaving a contaminated work area.

## 7.2 Work Area Access Control

If work is performed in public areas, the following precautions shall be taken to protect both the workers and the public. Access control to the work area will be accomplished by the use of a combination of the following devices and/or methods:

- Fences and/or barricades
- Traffic control devices and/or use of flaggers
- Caution tape
- Other methods to keep the site secure and provide a visual barrier to help keep unauthorized personnel from entering the site and active work areas

## 7.3 Hazardous Waste Site Work Control Procedures

To prevent contamination from migrating from personnel and equipment, work areas will be clearly specified as an Exclusion Zone/Hot Zone (EZ), Contaminant Reduction Zone (CRZ), or Support Zone/Clean Zone (SZ) prior to beginning operations. Each work area will be clearly identified using signs or physical barriers. At the end of each workday, the site should be secured and/or guarded to prevent unauthorized entry.

Site work zones will include:

- **Exclusion Zone/Hot Zone (EZ).** The EZ will be the “hot zone” or contaminated area inside the site perimeter (or sample collection area of boat). The EZ is the defined area where potential respiratory and/or health hazards exist. All personnel entering the EZ must use the required PPE, as set forth in this HASP, and meet the appropriate training and medical clearance. Entry to and exit from this zone will be made through a designated point. Appropriate warning signs to identify the EZ should be posted (e.g., DANGER, AUTHORIZED PERSONNEL ONLY, PROTECTIVE EQUIPMENT REQUIRED BEYOND THIS POINT). Personnel and equipment decontamination must be performed upon exiting the EZ.
- **Contaminant Reduction Zone (CRZ).** The CRZ, also known as the “warm zone,” is a transitional zone between the EZ and the SZ (also known as the “cold zone” or “clean zone”). The CRZ provides a location for removal and decontamination of PPE and tools leaving the EZ. A separate decontamination area will be established for heavy

equipment. All personnel and equipment must exit via the CRZ. If, at any time, the CRZ is compromised, a new CRZ will be established.

- **Support Zone/Clean Zone (SZ).** This uncontaminated zone will be the area outside the EZ and CRZ and within the geographic perimeters of the site (including boat and processing areas). The SZ is used for support personnel; staging materials; parking vehicles; office, laboratory, and sanitation facilities; and receiving deliveries. Personnel entering this zone may include delivery personnel, visitors, security guards, and others who will not necessarily be permitted in the EZ or CRZ.

A log of all personnel visiting, entering, or working on the site shall be maintained by the FL. No visitor will be allowed in the EZ without showing proof of training and medical certification, per 29 CFR 1910.120(e), (f), and 29 CFR 1926.1101(k)(9), (m) if appropriate. Visitors will attend a site orientation given by the FL and sign the HASP.

## **7.4 Site-specific Work Zone Requirements**

This section contains guidelines for maintaining safe conditions when working from a boat, in a roadway, or at an excavation site.

### **7.4.1 Sediment and Water Quality Sampling Work Zones**

This subsection contains guidelines concerning health and safety aboard marine sampling vessels. The vessel captain, onshore coring operator, and the FL will delineate the boundaries of the work zones aboard the vessel and will inform the field crews of the arrangement. The purpose of the zones is to limit the migration of sample material out of the zones and to restrict access to active work areas.

Two work zones will be observed aboard the vessel. One will encompass the “moonhole” of the vessel where the samplers will be deployed and recovered. Only the coring crew may enter this zone unless assistance is required by other personnel. The second work zone will be a sample processing area on the vessel. The contractor crew will deliver sediment core tubes to this zone and open them. Anchor QEA personnel will log and process the sediment cores either on the boat or on shore.

Both the collection and processing areas on the vessel and onshore will have a SZ outside the CRZ to stage clean equipment, don PPE, take rest breaks, or perform any other site activities that do not involve potentially contaminated materials.

#### *7.4.1.1 Vessel Decontamination Area*

A station will be set up for decontaminating sample processing equipment and personnel gear such as boots or PPE. The station will have the buckets, brushes, soapy water, rinse water, or wipes necessary to perform decontamination operations. Plastic bags will be provided for expendable and disposable materials. The decontamination fluids will be stored in sealable containers and will be properly disposed of.

#### *7.4.1.2 Access Control*

Security and control of access to the sampling vessel and onshore area will be the responsibility of the captain and FL. Additional security measures may be placed into effect by the client, or as required by national security threat levels determined by the federal government. Access to the vessel and onshore areas will only be granted to necessary project personnel and authorized visitors. Any security or access control problems will be reported to the client or appropriate authorities.

#### *7.4.1.3 Safety Equipment*

In addition to PPE that will be worn by shipboard personnel, basic emergency and first aid equipment will also be provided. Equipment will include:

- USCG-approved PFDs
- First aid kit adequate for the number of personnel
- Emergency eyewash

Anchor QEA and/or subconsultants will provide this equipment, which must be at the location(s) where field activities are being performed. Equipment will be checked daily to ensure its readiness for use.

### **7.4.2 Working in a Roadway**

Work conducted in public streets may require coordination with local city and/or county governments and development and submittal of a traffic control plan in accordance with the U.S. Department of Transportation (DOT) Manual on Uniform Traffic Control Devices (MUTCD). Use of personnel qualified as Flaggers may also be required to provide temporary traffic control.

Observe the following site control practices and procedures when working in roadways:

- Wear a traffic vest and hardhat when a vehicle hazard exists.
- Use cones, flag-mounted cones, caution tape, and/or barricades.
- Use a vehicle strobe light and block area with truck.
- Develop a traffic flow plan for high-traffic situations (as appropriate):
  - Use a flag person
  - Use a flashing arrow sign
  - Use “MEN WORKING” signs liberally
  - Obtain lane closing permits
  - Engage police details

See Sections 12.1.9 and 12.1.10 for additional information regarding motor vehicle operation and vehicular traffic.

## **7.5 Field Communications**

Communications between all Anchor QEA employees and subcontractors at the work site can be verbal and/or non-verbal. Verbal communication can be affected by the on-site background noise and various PPE. See Table 7-1 for a list of the types of communication methods and equipment to use, depending on site conditions. Communication equipment must be checked daily to ensure proper operation. All project personnel must be initially briefed on the communication methods prior to starting work; communication methods should be reviewed in daily safety meetings.



**Table 7-1**  
**Field Communication Methods**

<b>Type of Communication</b>	<b>Communication Device</b>	<b>Signal</b>
Emergency notification	On-site telephone or cellular telephone	Initiate phone call using applicable emergency numbers
Emergency notification among site personnel	Two-way radio	Initiate radio communication with Code Red message
Hailing site personnel for non-emergency	Compressed air horn	One long blast, one short blast
Hailing site personnel for emergency evacuation	Compressed air horn	Three long, continuous blasts
Hailing site personnel for distress, need help	Visual	Arms waved in circle overhead
Hailing site personnel for emergency evacuation	Visual	Arms waved in criss-cross over head
Contaminated air/strong odor	Visual	Hands clutching throat
Break, lunch, end of day	Visual	Two hands together, break apart

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## **8 DECONTAMINATION PROCEDURES AND PRACTICES**

### **8.1 Minimization of Contamination**

The following measures will be observed to prevent or minimize exposure to potentially contaminated materials:

- Personnel
  - Do not walk through spilled materials
  - Do not handle, touch, or smell sample media directly
  - Make sure PPE has no cuts or tears prior to use
  - Protect and cover any skin injuries
  - Stay upwind of airborne dusts and vapors
  - Do not eat, drink, chew tobacco, or smoke in the work zones
- Sampling Equipment and Vehicles/Vessels
  - Use care to avoid getting sampled media on the outside of sample containers
  - If necessary, bag sample containers before filling with sampled media
  - Place clean equipment on a plastic sheet to avoid direct contact with contaminated media
  - Keep contaminated equipment and tools separate from clean equipment and tools
  - Fill sample containers over a plastic tub to contain spillage
  - Clean up spilled material immediately to avoid tracking around the vehicle/vessel

### **8.2 Decontamination Equipment**

All vehicles, vessels, and equipment that have entered potentially contaminated areas will be visually inspected and, if necessary, decontaminated prior to leaving the area. If the level of vehicle contamination is low, decontamination may be limited to rinsing tires and wheel wells with an appropriate detergent and water. If the vehicle is significantly contaminated, steam cleaning or pressure washing may be required. Tools will be cleaned in the same manner. Rinsate from all decontamination activities will be collected for proper disposal. Decontamination of equipment and tools will take place within the CRZ.

The following supplies will be available to perform decontamination activities (additional or differing decontamination procedures may be identified for specific tasks):

- Wash and rinse buckets
- Tap water and phosphate-free detergent
- Scrub brushes
- Distilled/deionized water
- Deck pump with pressurized freshwater hose (aboard the vessel)
- Pressure washer/steam cleaner, if appropriate
- Paper towels and plastic garbage bags

### **8.3 Personnel Decontamination**

The FL will ensure that all site personnel are familiar with personnel decontamination procedures as listed below. All personnel wearing PPE in a work area (EZ) must undergo decontamination prior to entering the SZ. Personnel will perform the following decontamination procedures:

- Wash and rinse outer gloves and boots in portable buckets to remove gross contamination.
- If suit is heavily soiled, rinse it off.
- Remove outer gloves; inspect and discard if damaged. Leave inner gloves on. Personnel will remove their outer garment and gloves, dispose of them, and properly label container or drum. Personnel will then decontaminate their hard hats and boots with an aqueous solution of detergent or other appropriate cleaning solution. These items then will be hand-carried to the next station. Remove inner gloves.
- Thoroughly wash hands and face before leaving CRZ.
- Sanitize respirators and place in a clean plastic bag.

### **8.4 Sampling and Processing Equipment Decontamination**

To prevent sample cross-contamination, sampling and processing equipment in contact with soil, sediment, or water samples will undergo the following decontamination procedures when work is completed in the CRZ and prior to additional use:

1. Rinse with potable water and wash with scrub brush.

2. Wash with phosphate-free detergent (Alconox®).
3. Visually inspect the sampler and repeat the scrub and rinse step, if necessary. If scrubbing and rinsing with Alconox® is insufficient to remove visually observable tar-related contamination on equipment, the equipment will be scrubbed and rinsed using hexane (or similar type solution) until all visual signs of contamination are absent.
4. Rinse external sampling equipment with potable water three times prior to use. Rinse homogenizing equipment once with potable water and three times with distilled water prior to and between sample processing.

## **8.5 Handling of Investigation-Derived Waste**

All remaining soil or sediment, fluids used for decontamination of sampling equipment, and sample collection disposable wastes (e.g., gloves, paper towels, foil, or others) will be placed into appropriate containers and staged on site for disposal.

### **8.5.1 Disposable PPE**

Disposable PPE may include Tyvek suits, inner latex gloves, and respirator cartridges. Dispose of PPE according to the requirements of the client and state and federal agencies.

### **8.5.2 Non-disposable PPE**

Non-disposable PPE may include respirators and boots and gloves. When decontaminating respirators, observe the following practices and procedures:

- Wipe out the respirator with a disinfecting pad prior to donning.
- Decontaminate the respirator on site at the close of each day with an approved sanitizing solution.

When decontaminating boots and gloves, observe the following practices and procedures:

- Decontaminate the boots or gloves outside with a solution of detergent and water; rinse with water prior to leaving the site.
- Protect the boots or gloves from exposure by covering with disposable covers such as plastic to minimize required decontamination activities.

## **8.6 Sanitizing of Personal Protective Equipment**

Respirators, reusable protective clothing, and other personal articles must not only be decontaminated before being reused, but also sanitized. The insides of masks and clothing become soiled due to exhalation, body oils, and perspiration. Manufacturer's instructions should be used to sanitize respirator masks. If practical, reusable protective clothing should be machine-washed after a thorough decontamination; otherwise, it must be cleaned by hand.

## **8.7 Emergency Personnel Decontamination**

Personnel with medical problems or injuries may also require decontamination. There is the possibility that the decontamination may aggravate or cause more serious health effects. If prompt lifesaving, first aid, and medical treatment are required, decontamination procedures will be omitted. In either case, a member of the site management team will accompany contaminated personnel to the medical facility to advise on matters involving decontamination.

## **8.8 Containment of Decontamination Fluids**

As necessary, spill control measures will be used to contain contaminated runoff that may enter into clean areas. Use plastic sheeting, hay bales, or install a spill control system to prevent spills and contain contaminated water.

## **8.9 Pressure Washing**

The following procedure is required when using high-pressure washing equipment for decontamination purposes:

- Wear modified Level D protection, including a face shield and safety goggles.
- Ensure that other personnel are out of the area prior to decontamination.
- Secure the area around the decontamination pad with cones, caution tape, or barricades.

- Ensure that safe work practices and precautions are taken to minimize the potential for physical injury from high-pressure water spray. Follow the manufacturer's operating instructions.
- The pressure washer wand must be equipped with a safety release handle.
- Ensure that the area is clean after equipment is decontaminated. Barricades, cones, or caution tape must be left in place and secured at all times.

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## 9 HEALTH AND SAFETY TRAINING AND INFORMATIONAL PROGRAMS

This section describes the health and safety training and informational programs that Anchor QEA project site personnel must comply with.

### 9.1 Initial Project Site Orientation

Work on all Anchor QEA project sites will require participation in an initial health and safety orientation presented by the PM or FL that will consist of, at a minimum, the following topics:

- Jorgensen Forge site access requirements
- A review of the contents of this HASP, including the scope of work and associated site hazards and control methods and procedures.
- Provisions of this HASP are mandatory for all Anchor QEA personnel assigned to the project.
- Anchor QEA subcontractors are also expected to follow the provisions of this HASP unless they have their own HASP that covers their specific activities related to this project and includes the minimum requirements of this HASP.
- All visitors to the work site will also be required to abide by the requirements of this plan.
- Personnel assigned to perform work at the project site, working under the provisions of this HASP, will be required to read the plan and must sign the Health and Safety Plan Acknowledgement Form to confirm that they understand and agree to abide by the provisions of this plan. Personnel not directly affiliated with the project (i.e., visitors) may also be required to sign the Liability Waiver provided.

### 9.2 Daily Safety Meetings

Daily safety meetings (“tailgate meetings”) make accident prevention a top priority for everyone and reinforce awareness of important accident-prevention techniques. The following daily safety meeting procedures and practices are required:

- Daily safety meetings will be held each morning prior to conducting site activities.
- The Daily Safety Briefing form in Attachment 1 will be used to document each meeting.

- Copies of the completed Daily Safety Briefing forms will be maintained on site during the course of the project.

### **9.3 Hazardous Waste Operations Training**

Personnel working on project sites that present a potential exposure to hazardous wastes or other hazardous substances shall be trained in accordance with the requirements of the 29 CFR 1910.120 (HAZWOPER) regulation. Training requirements will consist of the following:

- Field personnel must complete a minimum of 40 hours of hazardous waste activity instruction.
- Field personnel must complete a minimum of 3 days of supervised field instruction.
- Field personnel assigned to the site will also have received 8 hours of refresher training if the time elapse since their previous training has exceeded 1 year.
- On-site managers and supervisors directly responsible for employees engaged in hazardous waste operations will receive an additional 8 hours of supervisory training.
- Field personnel shall be current in first aid/CPR training.
- Other training may be required depending on the task to be performed (e.g., confined space, excavation/trenching, underground storage tank removal, fall protection, respiratory protection, and hazard communication).

### **9.4 Transportation Worker Identification Credentials (TWIC)**

All Anchor QEA field personnel will maintain current TWIC status, pursuant to the Maritime Transportation Security Act of 2002, unless this requirement is waived specifically in writing by relevant property owners.

### **9.5 Hazard Communication Program**

The purpose of hazard communication (Employee Right-to-Know) is to ensure that the hazards of all chemicals located at the field project site are communicated to all Anchor QEA personnel and subcontractors according to 29 CFR 1926.59.



Every container of hazardous materials must be labeled by the manufacturer, who must also provide a MSDS upon initial order of the product and upon request thereafter. The actual format may differ from company to company (e.g., National Fire Protection Association [NFPA], Hazardous Material Information System [HMIS], or other), but the labels must contain similar types of information. Maintain manufacturer labels if at all possible. The label may use words or symbols to communicate the following:

- The name of the chemical
- The name, address, and emergency telephone number of the company that made or imported the chemical
- The physical hazards (Will it explode or catch fire? Is it reactive? Is it radioactive?)
- Any important storage or handling instruction
- The health hazards (Is it toxic? Could it cause cancer? Is it an irritant? What is the target organ?)
- The basic protective clothing, equipment, and procedures that are recommended when working with the chemical

Upon identification and design of specific work tasks, MSDS' for all chemicals brought onto the site or anticipated to be encountered on site shall be appended in Attachment 3 of this HASP. These MSDS' shall be readily available for reference by site personnel and emergency response personnel.

Hazardous materials received without proper labels shall be set aside and not distributed for use until properly labeled.

If a hazardous chemical is transferred into a portable container (approved safety can), even if it is for immediate use only, the contents of the portable container (e.g., acetone or gasoline) must be identified.

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## **10 GENERAL PPE REQUIREMENTS**

The minimum level of PPE should be selected according to the hazards that may be encountered during site activities in accordance with established EPA levels of protection (D and C). Only PPE that meets American National Standards Institute (ANSI) standards shall be worn. Workers must maintain proficiency in the use and care of PPE.

Refer to Section 5 of this plan for site-specific job task and level-of-protection requirements.

### **10.1 Minimum Requirements – Level D Protection**

The minimum level of protection on project sites will be Level D protection, which consists of the following equipment:

- Standard work uniform/coveralls
- Work boots with safety toe conforming to ASTM F2412-05/ASTM F2413-05
- Approved safety glasses or goggles (meets ANSI Z87.1 – 1989 requirements for eye protection)
- Hard hat (meets ANSI Z89.1 – 1986 requirements for head protection)
- Traffic safety vest
- Hearing protection when there are high noise levels

Level D protection will be used only when:

- The atmosphere contains no known hazards
- Work functions preclude splashes, immersions, or the potential for unexpected inhalation of, or contact with, hazardous concentrations of chemicals
- Atmospheric concentrations of contaminants are less than the PEL and/or TLV

#### **10.1.1 Modified Level D Protection Requirements**

Depending on future field tasks and the potential hazards to be encountered, Level D protection shall be modified to include additional protective equipment such as USCG-approved PFDs, face shields/goggles, chemical-resistant clothing, and disposable gloves of varying materials depending on the chemical substances involved. An upgrade to Modified

Level D occurs when there is a possibility that contaminated media can contact the skin or work uniform.

## **10.2 Respiratory Protection Requirements**

Respiratory protection is not anticipated at this time for field tasks on this project.

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## **11 GENERAL AIR MONITORING REQUIREMENTS**

### **11.1 General Requirements**

Air monitoring is not anticipated at this time for field tasks on this project. However, in the event that air monitoring is deemed necessary, this section provides reference information. Specific air monitoring procedures and action levels will be determined at that time.

In general, air monitoring shall be conducted when the possibility of hazardous atmospheres, chemical volatilization, or contaminated airborne dust exists (e.g., from intrusive activities involving contaminated soils and/or groundwater, developing new monitoring wells, wells containing known COCs, or confined space entry).

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## **12 HEALTH AND SAFETY PROCEDURES AND PRACTICES**

In addition to the task-specific JSAs that would be created pertinent to tasks listed in Section 6.1, this section lists the health and safety procedures and practices reasonably foreseen as applicable to this project. For additional information, consult with the PM.

### **12.1 Physical Hazards and Controls**

#### **12.1.1 General Site Activities**

Observe the following general procedures and practices to prevent physical hazards:

- Legible and understandable precautionary labels shall be affixed prominently to containers of potentially contaminated soil, sediment, water, and clothing.
- No food or beverages shall be present or consumed in areas that have the potential to contain COCs and/or contaminated materials or equipment.
- No tobacco products or cosmetics shall be present or used in areas that have the potential to contain COCs and/or contaminated materials or equipment.
- An emergency eyewash unit shall be located immediately adjacent to employees who handle hazardous or corrosive materials, including decontamination fluids. All operations involving the potential for eye injury or splash must have approved eyewash units locally available capable of delivering at least 0.4 gallons per minute for at least 15 minutes.
- On a project-specific basis, personnel working on or near bodies of water shall wear USCG-approved PFDs.
- Certain project sites may have newly finished work (e.g., concrete, paving, framing, habitat reconstruction, or shoreline containment) that may be damaged by unnecessary contact, or that could cause dangerous conditions for personnel (e.g., slipping, sinking, or tripping). Personnel working in or around these areas shall communicate with the PM, FL, and property owner as needed to prevent damaging new work or entering dangerous conditions.
- Generally, all on-site activities will be conducted during daylight hours. If work after dusk is planned or becomes necessary due to an emergency, adequate lighting must be provided.

- Hazardous work, such as handling hazardous materials and heavy loads and equipment operation, should not be conducted during severe storms.
- All temporary electrical power must have a ground fault circuit interrupter (GFCI) as part of its circuit if the circuit is not part of permanent wiring. All equipment must be suitable and approved for the class of hazard present.

### **12.1.2 Slip/Trip/Fall**

Observe the following procedures and practices to prevent slips, trips, and falls:

- Inspect each work area for slip/trip/fall potential prior to each work task.
- Slip/trip/fall hazards identified must be communicated to all personnel. Hazards identified shall be corrected or labeled with warning signs to be avoided.
- All personnel must be aware of their surroundings and maintain constant communication with each other at all times.

### **12.1.3 Sediment Core Sampling**

Sediment samples will be collected using a “Mud Mole” or vibracore sampling equipment operated from a boat. Please see Section 12.1.12 for additional safety information regarding working on or near the water.

All operations involving the use of powered sediment coring rigs will follow generally accepted drilling/coring practices. One person will be assigned the responsibility of Lead Driller/Corer. Additional personnel will assist with equipment as needed. The Lead Driller/Corer will be responsible for operating the drilling/coring rig and ensuring safety.

General rules associated with drilling/coring rig operations will be as follows:

- While drilling, all non-essential personnel shall remain at a distance that is past the radius of any moving parts.
- All operators and crew members will be familiar with the rig operations and will have received practical training.
- All personnel will be instructed in the use of the emergency kill switch/shutdown on the drill rig.

- No loose-fitting clothing, jewelry, or free long hair is permitted near the drilling rig or moving machinery parts.
- A first aid kit and fire extinguisher will be available at all times.
- No drilling will occur during impending electrical storms or tornadoes, or when rain, ice, snow, or wind conditions create undue potential hazards.
- Never allow “horsing around” within the vicinity of the drill rig and tool and supply storage areas, even when the drill rig is shut down.

#### **12.1.4    *Underground/Overhead Utility Line Contact Prevention***

Observe the following underground/overhead utility line contact prevention procedures and practices:

- Prior to conducting work, the PM or FL shall ensure that all existing underground or overhead utilities in the work area are located per the state or local mark-out methods. Documentation of utility mark-out shall be completed using the Utility Contact Prevention Checklist form (see Attachment 1). No excavation work is to be performed until all utility mark-outs are verified.
- The PM or FL shall conduct a site survey to search for signs of other buried or overhead utilities. The results of such surveys shall be documented on the Utility Mark-out documentation form.
- The property owner or facility operator shall be consulted on the issue of underground utilities. As-built drawings shall be reviewed, when available, to verify that underground utility locations are consistent with the utility location mark-outs. All knowledge of past and present utilities must be evaluated prior to conducting work.
- If on-site subsurface utility locations are in question, a private locating service shall be contacted to verify locations. If the investigation calls for boreholes in an area not covered by the municipal One-Call system, then a private utility locate firm shall be contacted to determine the location of other underground utilities.
- The PM shall have documented verbal contact and an agreement with the fiber optic company for all work within 50 feet of any fiber optic cables.

- **Only hand digging is permitted within 3 feet of underground high voltage, product, or gas lines.** Once the line is exposed, heavy equipment can be used, but must remain at least 3 feet from the exposed line.
- Elevated superstructures (e.g., drill rig, backhoe, scaffolding, ladders, and cranes) shall remain a distance of 10 feet away from utility lines and 20 feet away from power lines. Distance from utility lines may be adjusted by the FL depending on actual voltage of the lines.
- Overhead utility locations shall be marked with warning tape or flags where equipment has the potential for contacting overhead utilities.

Table 12-1 shows the minimum clearances required for energized overhead electrical lines.

**Table 12-1**  
**Overhead Utility Clearance Requirements**

Minimum Clearance from Energized Overhead Electric Lines	
Nominal System Voltage	Minimum Required Clearance
0 to 50 kV	10 feet
51 to 100 kV	12 feet
101 to 200 kV	15 feet
201 to 300 kV	20 feet
301 to 500 kV	25 feet
501 to 750 kV	35 feet
751 to 1000 kV	45 feet

Notes:

kV = kilovolts

Whenever equipment operations must be performed closer than 20 feet from overhead power lines, the F) must be notified. When clearance to proceed is received from the FL, the electric utility company must be contacted to turn the power off or physically insulate (protect) the lines if the operation must be performed closer to the power line than is allowed in this table. For voltages not listed on this table, add 0.4 inches per kV to obtain the safe distance between equipment and power lines.

### **12.1.5 Electrical Safety**

Observe the following procedures and practices to prevent electric shock:

- General



- Use only appropriately trained and certified electricians to perform tasks related to electrical equipment. A good rule of thumb is to defer any task that would not normally and reasonably be completed by the average public consumer.
- Ensure that all equipment is grounded with either an appropriate plug (i.e., “three-pronged”) or by using a GFCI.
- Test all GFCIs prior to use.
- Use only extension cords that are in good condition—if in doubt, throw it out.
- Use only 16-gauge, heavy duty, three-wire, Underwriters Laboratories Inc. (UL)-approved three-pronged extension cords
- Be sure to locate extension cords out of traffic areas or, if this is unavoidable, flag cords and protect workers from tripping over them (i.e., use barricades, tape the cord down, etc.)
- Do not stage extension cords or powered equipment in wet areas, to the degree possible. Elevate cords and equipment out of puddles.
- Specific
  - If unsure if a task requires specific electrical training, err on the side of caution and contact the PM and FL prior to proceeding.
  - If subsurface work is to be performed, follow the guidelines in Section 12.1.4 and conduct utility locating prior to work and in accordance with local ordinances.
  - If lock out/tag out (LO/TO) procedures are required (i.e., de-energizing machinery or equipment so that work may be performed), the equipment owner must provide LO/TO procedures and training. By default, the equipment owner should perform any LO/TO. If it becomes necessary for Anchor QEA personnel to perform LO/TO tasks, contact the PM and FL prior to doing so.
  - Maintain appropriate distance from overhead utilities (see Table 12-1).
  - If unexpected electrical equipment is encountered (i.e., buried wire) assume it is live, stop work, and contact the PM and FL immediately.

### **12.1.6 General Falls/Ladders**

Observe the following general falls/ladders procedures and practices:

- Assess work areas for fall hazards. A fall protection system that meets OSHA and ANSI Z3591 standards must be used if work is conducted 6 feet or more above the surface.
- Use Type 1A-rated ladders.
- Make sure ladder rungs are sturdy and free of cracks.
- Use ladders with secure safety feet.
- Pitch ladders at a 4 horizontal to 1 vertical (4H:1V) ratio.
- Secure ladders at the top or have another person at the bottom to help stabilize it.
- Ladders used to access an upper landing surface shall extend at least 3 feet above the upper landing surface.
- Use non-conductive ladders near electrical wires.
- The top rung of a ladder should not be used as a step.
- Do not carry any object or load that could cause a loss of balance or a fall.

### **12.1.7 Heavy Equipment Operations**

Observe the following heavy equipment operations procedures and practices:

- Wear leather gloves while attaching support members to protect against pinching injuries.
- While working from elevated levels greater than 6 feet, ensure that all employees have fall protection that meets OSHA and ANSI Z3591 standards.
- Do not stand under loads that are being raised or lowered with cranes or aerial lifts.
- The subcontractor or Anchor QEA equipment operator must conduct pre-operational inspections of all equipment. In addition, daily inspections will be conducted on the equipment prior to site activities.
- Maintain the appropriate distance from overhead utilities (see Table 12-1):
- Always stay out of the swing radius of all heavy equipment. Always use a spotter during movement of equipment. The spotter and others, as appropriate, shall maintain constant communication with the operator.
- All operators must have adequate training and be qualified to operate the particular heavy equipment unit.
- Conduct a site evaluation to determine proper positioning for the unit. Make sure the surface is level. Cordon off holes, drop-offs, bumps, or weak ground surfaces.

- When using a crane, do not use hands when the load is being lifted or lowered. Use non-conductive tag line to help direct and position the load.
- Never climb a raised platform or stand on the mid-rail or top-rail.
- Tools should always be hung or put into a belt whenever possible

### **12.1.8 Hand and Power Tools**

Observe the following procedures and practices when working with hand and power tools:

- Keep hand tools sharp, clean, oiled, dressed, and not abused.
- Worn tools are dangerous. For example, the “teeth” in a pipe wrench can slip if worn smooth, an adjustable wrench will slip if the jaws are sprung, and hammerheads can fly off loose handles.
- Tools subject to impact (e.g., chisels, star drills, and caulking irons) tend to “mushroom.” Keep them dressed to avoid flying spalls. Use tool holders.
- Do not force tools beyond their capacity.
- Flying objects can result from operating almost any power tool, so always warn people in the vicinity and use proper eye protection.
- Each power tool should be examined before use for damaged parts, loose fittings, and frayed or cut electric cords. Tag and return defective tools for repairs. Also inspect for adequate lighting, proper lubrication, and abandoned tools or material that could “vibrate into trouble.”
- Compressed air must be shut off or the electric cord unplugged before making tool adjustments. Air must be “bled down” before replacement or disconnection.
- Proper guards or shields must be installed on all power tools before issue. Do not use improper tools or tools without guards in place.
- Replace all guards before start-up. Remove cranks, keys, or wrenches used in service work.

### **12.1.9 Motor Vehicle Operation**

All drivers are required to have a valid driver’s license, and all vehicles must have appropriate state vehicle registration and inspection stickers. The use of hand-held wireless devices is prohibited by Anchor QEA while driving any vehicle for business use at any time,

for personal use during business hours, and as defined by law. Additionally, site-specific motor vehicle requirements must be followed, if any.

When driving to, from, and within the job site, be aware of potential hazards including:

- Vehicle accidents
- Distractions
- Fatigue
- Weather and road conditions

To mitigate these hazards, observe the following procedures and practices regarding motor vehicle operation:

- Wear a seat belt at all times and make sure that clothing will not interfere with driving.
- Inspect fluid levels and air pressure in tires, adjust mirrors and seat positions appropriately, watch the fuel level, and fill up when the fuel level is low.
- Plan your travel route and check maps for directions or discuss with colleagues.
- Clean windows and mirrors as needed throughout the trip.
- Wear sunglasses as needed.
- Follow a vehicle maintenance schedule to reduce the possibility of a breakdown while driving.
- Stop driving the vehicle, regardless of the speed (i.e., even 5 miles per hour [mph]) or location (i.e., a private road), when the potential of being distracted by conversation exists.
- Drivers are prohibited from using hand-held communication devices (e.g., cell phones) while operating any motor vehicle.
- Get adequate rest prior to driving.
- Periodically change your seat position, stretch, open the window, or turn on the radio to stay alert.
- Pull over and rest if you are experiencing drowsiness.
- Check road and weather conditions prior to driving.
- Be prepared to adjust your driving plans if conditions change.
- Travel in daylight hours, if possible.

- Give yourself plenty of time to allow for slowdowns due to construction, accidents, or other unforeseen circumstances.
- Use lights at night and lights and wipers during inclement weather.

#### **12.1.10 Vehicular Traffic**

Observe the following procedures and practices regarding vehicular traffic:

- Wear a traffic safety vest when vehicle hazards exist.
- Use cones, flags, barricades, and caution tape to define the work area.
- Use a vehicle to block work area.
- Engage a police detail for high-traffic situations.
- Always use a spotter in tight or congested areas for material deliveries.
- As necessary, develop traffic control plans and train personnel as flaggers in accordance with the DOT MUTCD and/or local requirements.

See Section 7.4.2 for additional information regarding work in roadways.

#### **12.1.11 Boating Operations**

The following precautions shall be followed when conducting boating trailer and launch activities:

- Follow the trailer and boat manufacturers' instructions for securing the boat to the trailer.
- Follow the trailer manufacturer's instructions for securing the trailer to the towing vehicle.
- Prohibit workers from moving into trailer/vehicle pinch points without advising the vehicle operator.
- Use experienced operators when backing trailers on boat ramps.
- Wear proper work gloves when the possibility of pinching or other injury may be caused by moving or handling large or heavy objects.
- Maintain all equipment in a safe condition.
- Launch boats one at a time to avoid collisions.
- Use a spotter for vehicles backing boats to the launch area.

- Understand and review hand signals.
- Wear boots with non-slip soles when launching boats.
- Wear USCG-approved PFDs when working on or near the water.
- Keep ropes and lines coiled and stowed to eliminate trip hazards.
- Maintain three-point contact on dock/pier or boat ladders.
- Ensure that drain plugs are in place, as present.

The following precautions shall be followed when conducting boating operations:

- Maintain a current boater's license(s) as required.
- Wear USCG-approved PFDs for work activities on or near the water.
- Obtain and review information regarding dams that may be present in work areas, particularly with regard to "no boating" zones and safety buoys, cables, and warning signage.
- Review man-overboard and emergency procedures
- Maintain boat anchorage devices commensurate with anticipate currents, distance to shore, and water depths.
- Provide a floating ring buoy with at least 90 feet of line in the immediate boat launch/landing areas.
- Step into the center of the boat.
- Keep your weight low when moving on the boat.
- Move slowly and deliberately.
- Steer directly across other boat wakes at a 90-degree angle to avoid capsizing.
- Steer the boat facing forward.
- Watch for floating objects in the water.
- Right-of-way is yielded to vessels on your boat's right, or starboard, and vessels with limited ability to maneuver such as any wind-propelled vessel.

The following precautions shall be followed when working on a boat:

- Observe proper lifting techniques.
- Obey lifting limits
- Use mechanical lifting equipment (i.e., pulleys or winches) to move large or awkward loads.

- Wear USCG-approved PFDs for work activities on or near the water.

The safety-related items listed in Table 12-2 shall be available when conducting boating operations:

**Table 12-2**  
**Safety Equipment Specific to In-water Work**

<b>Additional Safety Equipment for Sampling Vessel per U.S. Coast Guard (USCG) Requirements:</b>	
<ul style="list-style-type: none"> <li>• Proper vessel registration, numbering, and documentation (registered with state, certificate of vessel registration number displayed, and carrying a valid certificate of number)</li> <li>• USCG-approved PFDs, or life jackets, for every person on the sampling vessel (Type II PFD required, Type I PFD preferred as it will turn most unconscious wearers face up in the water)</li> <li>• Appropriate, non-expired, visual distress devices for day and night use from the following: <ul style="list-style-type: none"> <li>- Three hand-held red flares (day and night), or</li> <li>- One hand-held red flare and two parachute flares (day and night), or</li> <li>- One hand-held orange smoke signal, two floating orange smoke signals (day), and one electric distress light (night only)</li> </ul> </li> <li>• Alternate means of propulsion (oars or paddles)</li> <li>• Dewatering device (pump or bailer)</li> <li>• Properly maintained and inspected USCG-approved fire extinguishers (no fixed system = (2) B-1 or (1) B-2 type extinguishers; fixed system = (1) B-1 type extinguisher)</li> <li>• Proper ventilation of gasoline-powered vessels</li> <li>• Sound-producing device (whistle, bell, or horn)</li> <li>• VHF 2-way radio</li> <li>• Proper navigational light display</li> <li>• Throwable life ring with attached line (any vessel larger than 16 feet is required to carry one Type IV [throwable] PFD)</li> </ul>	
<b>Additional USCG-recommended Equipment Includes:</b>	
<ul style="list-style-type: none"> <li>• Extra visual distress signals</li> <li>• Primary and spare anchor</li> <li>• Heaving line</li> <li>• Fenders</li> <li>• First aid kit</li> <li>• Flashlight</li> <li>• Mirror</li> <li>• Searchlight</li> <li>• Sunburn lotion</li> <li>• Tool kit</li> <li>• Spare fuel</li> </ul>	<ul style="list-style-type: none"> <li>• Boat hook</li> <li>• Spare propeller</li> <li>• Mooring line</li> <li>• Food and water</li> <li>• Binoculars</li> <li>• Spare batteries</li> <li>• Sunglasses</li> <li>• Marine hardware</li> <li>• Extra clothing</li> <li>• Spare parts</li> <li>• Pertinent navigational chart(s) and compass</li> </ul>

### **12.1.12 Working Over or Near Water**

#### **12.1.12.1 Personal Flotation Devices**

PFDs are not required where employees are continuously protected from the hazard of drowning by railings, nets, safety belts, or other applicable provisions.



Type III, Type V, or better USCG-approved International Orange PFD shall be provided and properly worn by all personnel in the following circumstances:

1. On floating pipelines, pontoons, rafts, or stages.
2. On structures extending over or next to the water, except where guard rails or safety nets are provided for employees.
3. Working alone at night where there are drowning hazards, regardless of other safeguards provided.
4. In skiffs, small boats, or launches, unless in an enclosed cabin or cockpit.
5. Whenever there is a drowning hazard.

The following precautions shall be followed when using PFDs:

- Prior to and after each use, the buoyant work vests or life preservers shall be inspected for defects that would alter their strength or buoyancy. Defective devices or devices with less than 13 pounds buoyancy shall be removed from service.
- All PFDs shall be equipped with reflective tape as specified in 46 CFR 25.25-15.
- Thirty-inch USCG-approved ring buoys with at least 150 feet of 600-pound capacity line shall be provided and readily available for emergency rescue operations. The distance between ring buoys shall not exceed 200 feet.
- PFD lights conforming to 46 CFR 161.012 shall be required whenever there is a potential need for life rings to be used after dark. On shore installations, at least one life ring, and every third one thereafter, shall have a PFD light attached. PFD lights on life rings are required only in locations where adequate general lighting (e.g., floodlights or light stanchions) is not provided.

#### **12.1.12.2 Cold Water Work**

When the combined air and water temperature is below 50° F, field personnel working on or near water shall wear either a float coat and bib-overalls (e.g., a full two-piece “Mustang” survival suit or similar), or a one-piece survival suit. Suits or float coats shall be USCG-approved. If extremely cold or severe weather conditions are forecast, work activities should be postponed. Work activities will be continually reviewed and adjustments made if wearing a survival suit during work activities potentially poses a hazard due to warm air

temperatures, or limited mobility or agility. In addition, proximity of water work to shore and scope/duration/timing of work activities will be considered when stipulating the above requirement. Overall, if water craft will be used during work, or work will be conducted near water, it is imperative that site specific conditions are considered and evaluated so that proper safeguards and procedures are in place prior to beginning work.

In addition to considering the use of apparel appropriate for anticipated air, weather, and water conditions, field teams shall identify any procedures necessary for cold-water “man-overboard” scenarios. These procedures should be identified in the site-specific HASP, described in the JSA used for boating activities and, if prudent, practiced before work.

### **12.1.13 Noise**

Excessive noise is hazardous not only because of its potential to damage hearing, but also because of its potential to disrupt communications and instructions. The following procedures and practices shall be followed to prevent noise-related hazards:

- All employees will have access to disposable ear plugs with a Noise Reduction Rating of not less than 30.
- Ear plugs must be worn in any environment where workers must raise their voices to be heard while standing at a distance of 3 feet or less.
- Ear plugs must be worn by any personnel operating concrete cutting or sawing equipment.

Hearing protection is required for workers operating or working near noisy equipment or operations, where the noise level is greater than 85 A-weighted decibels (dbA) (TWA), as well as personnel working around heavy equipment. The FL will determine the need and appropriate testing procedures, (i.e., sound level meter and/or dosimeter) for noise measurement.

When needed, a sound level meter will be used to measure noise levels at selected locations in the work area and on the site perimeter. When used, noise monitoring equipment must be calibrated before and after each shift.

If continuous noise levels are found to exceed 85 dbA at any location within the work area, warning signs will be posted. Workers and visitors will be notified that hearing protection is required. Appropriate hearing protection (i.e., ear plugs or ear muffs) will be worn whenever personnel or visitors are working in that location. A supply of ear plugs will be maintained on site.

Action levels in Table 12-3 will trigger the use of appropriate hearing protection (plugs or muffs). Hearing protection must be able to attenuate noise below 90 dbA (8-hour TWA). Each hearing protection or device has a Noise Reduction Rating (NRR) assigned by EPA. The calculation for a hearing protection device's effectiveness is:

$$\text{Noise reading dbA} - (\text{NRR} - 7\text{dB}) < 90 \text{ dbA}$$

**Table 12-3**  
**Noise Exposure Action Levels**

Instrument	Measurement	Action
Type I or Type II Sound Level Meter or Dosimeter	> 80 dbA to 85 dbA	Hearing protection recommended. Limit work duration to 8-hour shifts.
	> 85 dbA to 90 dbA	Hearing protection required. Limit work duration to 8-hour shifts.
	> 90 dbA to 115 dbA	Hearing protection required. Investigate use of engineering controls. Limit work duration to 8-hour shifts.
	> 115 dbA	Stop work. Consult CHSM.

DbA = A-weighted decibel

CHSM = Corporate Health and Safety Manager

#### **12.1.14 Lifting and Material Handling**

Observe the following procedures and practices for lifting and material handling:

- Use leather gloves when handling metal, wire rope, sharp debris, or transporting materials (e.g., wood, piping, or drums).

- The size, shape, and weight of the object to be lifted must first be considered. No individual employee is permitted to lift any object that weighs over 60 pounds. Multiple employees or mechanical lifting devices are required for objects over the 60-pound limit.
- Plan a lift before doing it. Bend at the knees and lift with the legs; keep the natural curves of the back; do not use back muscles.
- Check the planned route for clearance.
- Use the buddy system when lifting heavy or awkward objects.
- Do not twist your body while lifting.
- Know the capacity of any handling device (e.g., crane, forklift, chain fall, or come-along) that you intend to use.
- Use tag lines to control loads.
- Ensure that your body, material, tools, and equipment are safe from such unexpected movement as falling, slipping, rolling, tripping, bowing, or any other uncontrolled motion.
- Trucks (i.e., flat beds) hauling equipment or materials must not be moved once rigging has been released.
- Chock all material and equipment (e.g., pipe, drums, tanks, reels, trailers, and wagons) as necessary to prevent rolling.
- Tie down all light, large-surface-area material that might be moved by the wind.
- When working at heights, secure tools, equipment, and wrenches against falling.
- Do not store materials or tools on ducts, lighting fixtures, beam flanges, hung ceilings, or similar elevated locations.
- Fuel-powered tools used inside buildings or enclosures shall be vented and checked for excessive noise.

#### **12.1.15 Fire Control**

Observe the following fire control procedures and practices:

- Smoke only in designated areas.
- Keep flammable liquids in closed containers.
- Keep the work site clean; avoid accumulating combustible debris such as paper.

- Obtain and follow property owner hot work safety procedures when welding or performing other activities requiring an open flame.
- Isolate flammable and combustible materials from ignition sources.
- Ensure fire safety integrity of equipment installations according to National Electrical Code (NEC) specifications.

#### **12.1.16 Static Electricity and Transfer of Flammable Liquids**

Observe the following procedures and practices regarding static electricity when transferring flammable liquids:

- Electrically bond and ground pumps, transfer vessels, tanks, drums, bailers, and probes when moving flammable liquids.
- Electrically bond and ground vacuum trucks and the tanks they are emptying.
- Do not splash fill containers with flammable liquids.
- Pour flammable liquids slowly and carefully.
- Two fire extinguishers (2A20:BC) must be available, charged, inspected, and readily accessible.

#### **12.1.17 Cleaning Equipment**

Observe the following procedures and practices when cleaning equipment:

- Wear appropriate PPE to avoid skin and eye contact with isopropyl alcohol, Alconox®, or other cleaning materials.
- Stand upwind to minimize any potential inhalation exposure.
- Dispose of spent cleaning solutions and rinses accordingly.

### **12.2 Environmental Hazards and Controls**

#### **12.2.1 Heat Stress**

Observe the following general procedures and practices regarding heat stress:

- Increase the number of rest breaks and/or rotate workers in shorter work shifts.
- Watch for signs and symptoms of heat stress and fatigue (see Section 12.2.1.1).
- During hot months, plan work for early morning or evening.
- Use ice vests when necessary.

- Rest in cool, dry areas.

#### *12.2.1.1 Signs, Symptoms, and Treatment*

Adverse climatic conditions are important considerations in planning and conducting site operations. High ambient temperature can result in health effects ranging from transient heat fatigue, physical discomfort, reduced efficiency, personal illness, and increased accident probability to serious illness or death. Heat stress is of particular concern when chemical protective garments are worn since they prevent evaporative body cooling. Wearing PPE places employees at considerable risk of developing heat stress.

Heat stress is caused by a number of interacting factors, including environmental conditions, clothing, workload, and the individual characteristics of the worker. Because heat stress is probably one of the most common (and potentially serious) illnesses, regular monitoring and other preventive precautions are vital.

**Heat Rash.** Heat rash can be caused by continuous exposure to hot and humid air and skin abrasion from sweat-soaked clothing, rubber boots, or impermeable waders. The condition is characterized by a localized red skin rash and reduced sweating. Heat rash reduces the ability to tolerate heat. To treat, keep skin hygienically clean and allow it to dry thoroughly after using chemical protective clothing. Take measures to prevent heat rash by changing clothes often to maximize use of dry garments, or taking frequent breaks to allow doffing of equipment and drying of skin.

**Heat Cramps.** Heat cramps are caused by profuse perspiration with inadequate electrolytic fluid replacement. This often robs the larger muscle groups (stomach and quadriceps) of blood, which can cause painful muscle spasms and pain in the extremities and abdomen. To treat, remove the employee to a cool place and give sips of water or an electrolytic drink. Watch for signs of heat exhaustion or heat stroke.

**Heat Exhaustion.** Heat exhaustion is a mild form of shock caused by increased stress on various organs to meet increased demand to cool the body. Onset is gradual and symptoms should subside within 1 hour. Symptoms include a weak pulse; shallow breathing; pale, cool,

moist skin; profuse sweating; dizziness; and fatigue. To treat, remove the employee to a cool place and remove as much clothing as possible. Give sips of water or electrolytic solution and fan the person continuously to remove heat by convection. Do not allow the affected person to become chilled. Treat for shock if necessary.

**Heat Stroke.** Heat stroke is the most severe form of heat stress; the body must be cooled immediately to prevent severe injury and/or death. ***This is a medical emergency!*** Symptoms include red, hot, dry skin; a body temperature of 105° F or higher; no perspiration; nausea; dizziness and confusion; and a strong, rapid pulse. Since heat stroke is a true medical emergency, transport the patient to a medical facility immediately. Prior to transport, remove as much clothing as possible and wrap the patient in a sheet soaked with water. Fan the patient vigorously while transporting to help reduce body temperature. If available, apply cold packs under the arms, around the neck, or any other place where they can cool large surface blood vessels. If transportation to a medical facility is delayed, reduce body temperature by immersing the patient in a cool-water bath (however, be careful not to over-chill the patient once body temperature is reduced below 102° F). If this is not possible, keep the patient wrapped in a sheet and continuously douse with water and fan.

#### **12.2.1.2 Prevention**

The implementation of preventative measures is the most effective way to limit the effects of heat-related illnesses. During periods of high heat, adequate liquids must be provided to replace lost body fluids. Replacement fluids can be a 0.1 percent saltwater solution, a commercial mix such as Gatorade, or a combination of these with fresh water. The replacement fluid temperature should be kept cool, 50° F to 60° F, and should be placed close to the work area. Employees must be encouraged to drink more than the amount required to satisfy thirst. Employees should also be encouraged to salt their foods more heavily during hot times of the year.

Cooling devices such as vortex tubes or cooling vests can be worn beneath impermeable clothing. If cooling devices are worn, only physiological monitoring will be used to determine work activity.

All workers are to rest when any symptoms of heat stress are noticed. Rest breaks are to be taken in a cool, shaded rest area. Employees shall remove chemical protective garments during rest periods and will not be assigned other tasks.

All employees shall be informed of the importance of adequate rest and proper diet, including the harmful effects of excessive alcohol and caffeine consumption.

#### **12.2.1.3     *Monitoring***

Heat stress monitoring should be performed when employees are working in environments exceeding 90° F ambient air temperature. If employees are wearing impermeable clothing, this monitoring should begin at 77° F. There are two general types of monitoring that the health and safety representative can designate to be used: wet bulb globe temperature (WBGT), and physiological. The Heat Stress Monitoring Record form (see Attachment 1) will be used to record the results of heat stress monitoring.

Note that some states such as Washington and California have specific regulatory standards for protection of employees from heat stress-related injuries.

**Wet Bulb Globe Temperature (WBGT).** The WBGT index is the simplest and most suitable technique to measure the environmental factors that most nearly correlate with core body temperature and other physiological responses to heat. When WBGT exceeds 25 °C (77° F), the work regimen in Table 12-4 should be followed.



**Table 12-4**  
**Permissible Heat Exposure Threshold Limit Values**

Work/Rest Regimen	Workload		
	Light	Moderate	Heavy
Continuous work	86° F (30.0° C)	80° F (26.7° C)	77° F (25.0° C)
75% work, 25% rest each hour	87° F (30.6° C)	82° F (28.0° C)	78° F (25.9° C)
50% work, 50% rest, each hour	89° F (31.4° C)	85° F (29.4° C)	82° F (27.9° C)
25% work, 75% rest, each hour	90° F (32.2° C)	88° F (31.1° C)	86° F (30.0° C)

Notes:

° C = degrees Celsius

° F = degrees Fahrenheit

These TLVs are based on the assumption that nearly all acclimated, fully-clothed workers with adequate water and salt intake should be able to function effectively under the given working conditions without exceeding a deep body temperature of 100.4° F (38° C).

(From OSHA Technical Manual, Section III: Chapter 4 - Heat Stress)

The TLVs denoted in Table 12-4 apply to physically fit and acclimatized individuals wearing light, summer clothing. If heavier clothing that impedes sweat or has a higher insulation value is required, the permissible heat exposure TLVs should be adjusted based on the WBGT Correction Factors in Table 12-5.

**Table 12-5**  
**WBGT Correction Factors**

Clothing Type	WBGT Correction
Summer lightweight working clothing	32° F (0° C)
Cotton coveralls	28° F (-2° C)
Winter work clothing	25° F (-4° C)
Water barrier, permeable	86° F (-6° C)
Fully encapsulating	14° F (-10° C)

**Physiological.** Physiological monitoring can be used in lieu of, or in addition to, WBGT. This monitoring can be self-performed once the health and safety representative demonstrates appropriate techniques to affected employees. Since individuals vary in their

susceptibility to heat, this type of monitoring has its advantages. The two parameters that are to be monitored at the beginning of each rest period are:

- **Heart Rate** – The maximum heart rate (MHR) is the amount of work (beats) per minute a healthy person's heart can be expected to safely deliver. Each individual will count his/her radial (wrist) pulse for 1 minute as early as possible during each rest period. If the heart rate of any individual exceeds 75 percent of their calculated MHR ( $MHR = 200 - \text{age}$ ) at the beginning of the rest period, then the work cycle will be decreased by one-third. The rest period will remain the same. An individual is not permitted to return to work until his/her sustained heart rate is below 75 percent of their calculated MHR.
- **Temperature** – Each individual will measure his/her temperature with a thermometer for 1 minute as early as possible in the first rest period. If the temperature exceeds 99.6° F at the beginning of the rest period, then the work cycle will be decreased by one-third. The rest period will remain the same. An individual is not permitted to return to work if his/her temperature exceeds 100.4° F.

#### **12.2.1.4     Training**

Employees potentially exposed to heat stress conditions will be instructed on the contents of this procedure. This training can be conducted during daily tailgate safety meetings.

#### **12.2.2     Cold Stress**

Observe the following procedures and practices regarding cold stress:

- Take breaks in heated shelters when working in extremely cold temperatures.
- Upon entering the shelter, remove the outer layer of clothing and loosen other layers to promote evaporation of perspiration.
- Drink warm liquids to reduce the susceptibility to cold stress.
- Be aware of cold stress symptoms, including shivering, numbness in the extremities, and sluggishness.
- Provide adequate insulating dry clothing to maintain warmth if work is performed in air temperature below 40° F. Wind chill cooling rates and the cooling power of air

are critical factors. The higher the wind speed and the lower the temperature in the work area, the greater the insulation value of the protective clothing required.

- If the air temperature is 32° F or less, hands should be protected.
- If only light work is involved and if the clothing on the worker may become wet on the job site, the outer layer of the clothing in use should be impermeable to water. With more severe work under such conditions, the outer layer should be water repellent, and the outer wear should be changed as it becomes wetted. The outer garments should include provisions for easy ventilation in order to prevent wetting of the inner layer by sweat.
- If available clothing does not give adequate protection to prevent cold injury, work should be modified or suspended until adequate clothing is made available, or until weather conditions improve.
- Implement a buddy system in which workers are responsible for observing fellow workers for early signs and symptoms of cold stress.

#### *12.2.2.1 Signs, Symptoms, and Treatment*

Cold stress can range from frostbite to hypothermia. The signs and symptoms of cold stress are listed below. The appropriate guidelines should be followed if any personnel exhibit these symptoms:

**Frostbite.** Frostbite is characterized by pain in the extremities and loss of manual dexterity. "Frostnip," or reddening of the tissue, is accompanied by a tingling or loss of sensation in the extremities and continuous shivering.

**Hypothermia.** Hypothermia is characterized by pain in the extremities and loss of manual dexterity, with severe, uncontrollable shivering, and an inability to maintain the level of activity. Symptoms include excessive fatigue, drowsiness, irritability, or euphoria. Severe hypothermia includes clouded consciousness, low blood pressure, pupil dilation, cessation of shivering, unconsciousness, and possible death.

Remove the patient to a warm, dry place. If the patient's clothing is wet, remove it and replace it with dry clothing. Keep the patient warm. Re-warming of the patient should be

gradual to avoid stroke symptoms. Dehydration, or the loss of body fluids, may result in a cold injury due to a significant change in blood flow to the extremities. If the patient is conscious and alert, warm sweet liquids should be provided. Coffee and other caffeinated liquids should be avoided because of diuretic and circulatory effects. Extremities affected by frostbite should be gradually warmed up and returned to normal temperature. Moist compresses should be applied; begin with lukewarm compresses and slowly increase the temperature as changes in skin temperature are detected. Keep the patient warm and calm and remove them to a medical facility as soon as possible.

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## 13 MEDICAL SURVEILLANCE PROGRAM

This section describes the medical surveillance program that Anchor QEA field personnel must comply with when working on sites where there is a potential for exposure to hazardous wastes or other hazardous substances.

### 13.1 General Requirements

Anchor QEA employees shall be enrolled in a medical surveillance program in compliance with OSHA standards (29 CFR 1910.120[f]) under the following circumstances:

If they are involved with any of the following operations:

- *Cleanup operations* required by a governmental body, whether federal, state, local, or other involving hazardous substances that are conducted at uncontrolled hazardous waste sites (including, but not limited to, the EPA's National Priority List [NPL] sites, state priority list sites, sites recommended for the EPA NPL, and initial investigation of government-identified sites that are conducted before the presence or absence of hazardous substances has been ascertained).
- *Corrective actions* involving cleanup operations at sites covered by the Resource Conservation and Recovery Act of 1976 (RCRA) as amended (42 U.S.C. 6901 et seq)
- *Voluntary cleanup operations* at sites recognized by federal, state, local, or other governmental bodies as uncontrolled hazardous waste sites.
- *Operations involving hazardous wastes* that are conducted at treatment, storage, and disposal (TSD) facilities regulated by 40 CFR Parts 264 and 265 pursuant to RCRA or by agencies under agreement with the EPA to implement RCRA regulations.
- *Emergency response operations* for releases of, or substantial threats of releases of, hazardous substances without regard to the location of the hazard.

And, if the employee(s) meets the following criteria:

- Are or may be exposed to hazardous substances or health hazards at or above the established PEL, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more per year.

In addition, employees are required to be enrolled in the medical surveillance program if they meet any of the following conditions:

- Wear a respirator for 30 days or more per year
- Are injured, become ill, or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operations
- Are members of a Hazardous Materials (HAZMAT) team

Anchor QEA employees required to be enrolled in a medical surveillance program under 29 CFR 1910.120(f) shall have medical examinations and consultations made available to them by Anchor QEA on the following schedule:

- Prior to assignment
- At least once every 12 months unless the attending physician believes a longer interval (not greater than biennially) is appropriate
- At termination of employment or reassignment to an area where the employee would not be covered if the employee has not had an examination within the last 6 months
- As soon as possible upon notification that the employee has developed signs or symptoms indicating possible overexposure to hazardous substances or health hazards, or that the employee has been injured or exposed above the PEL or published exposure levels in an emergency situation
- At more frequent times, if the examining physician determines that an increased frequency of examination is medically necessary

The content of medical examinations or consultations made available to employees shall be determined by the attending physician but shall include, at a minimum, a medical and work history with special emphasis on symptoms related to the handling of hazardous substances and health hazards, and to fitness for duty including the ability to wear any required PPE under conditions (e.g., temperature extremes) that may be expected at the work site.

The attending physician shall provide Anchor QEA with a written opinion for each examined employee that contains the following information:

- Whether the employee has any detected medical conditions that would place the employee at an increased risk of impairment of the employee's health from hazardous waste operations work, emergency response, or respirator use
- Any recommended limitations on the employee's assigned work
- A statement that the employee has been informed of the results of the medical examination and any medical conditions that require further examination or treatment

The written opinion obtained by Anchor QEA shall not reveal specific findings or diagnoses unrelated to occupational exposures. Medical surveillance and other employee-related medical records shall be retained for at least the duration of employment plus 30 years.

### **13.2 Crew Self-Monitoring**

All personnel will be instructed to look for and inform each other of any deleterious changes in their physical or mental condition during the performance of all field activities. Examples of such changes are as follows:

- Headaches
- Dizziness
- Nausea
- Blurred vision
- Cramps
- Irritation of eyes, skin, or respiratory system
- Changes in complexion or skin color
- Changes in apparent motor coordination
- Increased frequency of minor mistakes
- Excessive salivation or changes in papillary response
- Changes in speech ability or speech pattern
- Symptoms of heat stress or heat exhaustion
- Symptoms of hypothermia

If any of these conditions develop, the affected person will be moved from the immediate work location and evaluated. If further assistance is needed, personnel at the local hospital

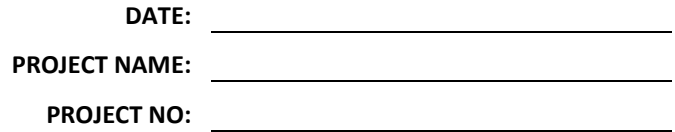
will be notified, and an ambulance will be summoned if the condition is thought to be serious. If the condition is the result of sample collection or processing activities, procedures and/or PPE will be modified to address the problem.



# ATTACHMENT 1

## HEALTH AND SAFETY LOGS AND FORMS

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PERSON CONDUCTING MEETING: \_\_\_\_\_ HEALTH & SAFETY OFFICER: \_\_\_\_\_ PROJECT MANAGER: \_\_\_\_\_

<input type="checkbox"/> Emergency Procedures and Evacuation Route	<input type="checkbox"/> Lines of Authority	<input type="checkbox"/> Lifting Techniques
<input type="checkbox"/> Directions to Hospital	<input type="checkbox"/> Communication	<input type="checkbox"/> Slips, Trips, and Falls
<input type="checkbox"/> HASP Review and Location	<input type="checkbox"/> Site Security	<input type="checkbox"/> Hazard Exposure Routes
<input type="checkbox"/> Safety Equipment Location	<input type="checkbox"/> Vessel Safety Protocols	<input type="checkbox"/> Heat and Cold Stress
<input type="checkbox"/> Proper Safety Equipment Use	<input type="checkbox"/> Work Zones	<input type="checkbox"/> Overhead and Underfoot Hazards
<input type="checkbox"/> Employee Right-to-Know/MSDS Location	<input type="checkbox"/> Vehicle Safety and Driving/Road Conditions	<input type="checkbox"/> Chemical Hazards
<input type="checkbox"/> Fire Extinguisher Location	<input type="checkbox"/> Equipment Safety and Operation	<input type="checkbox"/> Flammable Hazards
<input type="checkbox"/> Eye Wash Station Location	<input type="checkbox"/> Proper Use of PPE	<input type="checkbox"/> Biological Hazards
<input type="checkbox"/> Buddy System	<input type="checkbox"/> Decontamination Procedures	<input type="checkbox"/> Eating/Drinking/Smoking
<input type="checkbox"/> Self and Coworker Monitoring	<input type="checkbox"/> Other:	

1 of 1



DATE: \_\_\_\_\_

PROJECT NAME: \_\_\_\_\_

PROJECT NO: \_\_\_\_\_

## MODIFICATION TO HEALTH AND SAFETY PLAN

MODIFICATION: \_\_\_\_\_

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REASON FOR MODIFICATION: \_\_\_\_\_

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### SITE PERSONNEL BRIEFED

NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

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NAME: \_\_\_\_\_ DATE: \_\_\_\_\_

### APPROVALS

FIELD LEAD: \_\_\_\_\_  
Printed Name Signature Date

PROJECT  
MANAGER: \_\_\_\_\_  
Printed Name Signature Date



DATE: \_\_\_\_\_

PROJECT NAME: \_\_\_\_\_

PROJECT NUMBER: \_\_\_\_\_

LOCATION: \_\_\_\_\_

## HEAT STRESS MONITORING RECORD

Employee Name	Monitoring Results													
	Initial Reading Time:	First Work Period Time:		Second Work Period Time:		Third Work Period Time:		Fourth Work Period Time:		Fifth Work Period Time:		Sixth Work Period Time:		
	WBGT (°F):	WBGT (°F):		WBGT (°F):		WBGT (°F):		WBGT (°F):		WBGT (°F):		WBGT (°F):		
	Air Temp (°F):	Air Temp (°F):		Air Temp (°F):		Air Temp (°F):		Air Temp (°F):		Air Temp (°F):		Air Temp (°F):		
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Notes:

Completed by:

Printed Name

Signature

Date



## UTILITY CONTACT PREVENTION CHECKLIST

*NOTE: Utility mark-out requirements vary from state to state; consult state authorities before work.*

**Purpose:** This form is intended to help the Field Lead confirm that underground or overhead utilities are identified to the extent practicable and consistent with applicable regulations prior to site work.

**PROJECT NAME/NO:** \_\_\_\_\_ **DATE:** \_\_\_\_\_

**FIELD LEAD:** \_\_\_\_\_ **STATE:** \_\_\_\_\_

**PROJECT MANAGER:** \_\_\_\_\_ **HEALTH & SAFETY OFFICER:** \_\_\_\_\_

**EMERGENCY CONTACT INFORMATION FOR ONE-CALL:** \_\_\_\_\_

**DURATION/SUMMARY OF WORK TO BE PERFORMED:** \_\_\_\_\_

Consideration	Check		Explanation	Initial
Has the state one-call been contacted?	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
Has the property owner or client been contacted for local knowledge of utilities, as applicable?	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
Are any as-built drawings available? If so, do they show any utilities?	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
Has a visual inspection of the work area(s) been completed?	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
Has a private locating service been contacted?	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
Were any utilities identified and marked out through private locating service? If so, duplicate mark outs on site drawings.	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
Are there any fiber optic cables, fuel lines, or high pressure lines within 50 feet of hole locations?	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
If fiber optic cables, fuel lines, or high pressure lines are within 50 feet has an agreement with the utility owner been established, if applicable?	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
Can a test borehole be advanced by hand digging, probing, post hole digging, and/or air knifed to 5 feet below ground surface (bgs)?	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
If hand digging, probing, post hole digging, and or air knifing to 5 feet bgs is not possible, can a non-invasive geophysical investigation be conducted? If not, why?	<input type="checkbox"/> Yes	<input type="checkbox"/> No		
Other considerations:				

**NOTE: Please fill in second page and attach additional reports, drawings, or other information as necessary.**



## UTILITY CONTACT PREVENTION CHECKLIST

*NOTE: Utility mark-out requirements vary from state to state; consult state authorities before work.*

**CONFIRMATION NUMBER:** \_\_\_\_\_

**CONTACT NAME:** \_\_\_\_\_ **ORGANIZATION:** \_\_\_\_\_

**CONTACT DATE:** \_\_\_\_\_ **CONTACT TIME:** \_\_\_\_\_

**RESPONSE:** \_\_\_\_\_

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*Completed by:*

\_\_\_\_\_  
Printed Name                      Signature                      Date

*Contractor:*

\_\_\_\_\_  
Printed Name                      Signature                      Date

# ATTACHMENT 2

## JOB SAFETY ANALYSIS (JSA)

### DOCUMENTS

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## Job Safety Analysis

*Jorgensen Forge Early Action Area*

JSA00X

<b>Project Name &amp; Number:</b>	<b>JSA No.</b>	<b>Date:</b>	<b>New:</b>
<b>Location:</b>	<b>Contractor:</b>	<b>Analysis by:</b>	<b>Date:</b>
<b>Required Personal Protective Equipment:</b>		<b>Revised by:</b>	<b>Revised:</b>
<b>Work Operation:</b>	<b>Competent Person:</b>	<b>Reviewed by:</b>	<b>Date:</b>
		<b>Approved by:</b>	<b>Date:</b>

Work Activity	Potential Hazards	Preventive or Corrective Measures	Inspection Requirements

### Training Requirements:

All personnel working on hazardous waste sites must receive appropriate training as required by 29 CFR 1910.120(e), including, but not limited to initial 40-hour and annual 8-hour refresher training. All boat operators must have successfully completed the boating license consistent with Washington requirements.

All assigned employees are required to familiarize themselves with the contents of this JSA before starting a work activity and review it with their Supervisor during their Daily Safety Meeting.



ATTACHMENT 3  
MATERIAL SAFETY DATA SHEETS (MSDS)

## Material Safety Data Sheet

Version 4.4

Revision Date 10/28/2011

Print Date 11/28/2011

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1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Benzo[a]pyrene

Product Number : B1760

Brand : Sigma

Supplier : Sigma-Aldrich  
3050 Spruce Street  
SAINT LOUIS MO 63103  
USA

Telephone : +1 800-325-5832

Fax : +1 800-325-5052

Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555

Preparation Information : Sigma-Aldrich Corporation  
Product Safety - Americas Region  
1-800-521-8956

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2. HAZARDS IDENTIFICATION

## Emergency Overview

## OSHA Hazards

Carcinogen, Respiratory sensitiser, Teratogen, Reproductive hazard, Mutagen

## Target Organs

Lungs, Skin

## GHS Classification

Skin irritation (Category 3)

Respiratory sensitization (Category 1)

Germ cell mutagenicity (Category 1B)

Carcinogenicity (Category 1B)

Reproductive toxicity (Category 1B)

Acute aquatic toxicity (Category 1)

Chronic aquatic toxicity (Category 1)

## GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H316

Causes mild skin irritation.

H334

May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H340

May cause genetic defects.

H350

May cause cancer.

H360

May damage fertility or the unborn child.

H410

Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201

Obtain special instructions before use.

P261

Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

P273

Avoid release to the environment.

P308 + P313  
P501

IF exposed or concerned: Get medical advice/ attention.  
Dispose of contents/ container to an approved waste disposal plant.

#### HMIS Classification

Health hazard: 3  
Chronic Health Hazard: \*  
Flammability: 0  
Physical hazards: 0

#### NFPA Rating

Health hazard: 3  
Fire: 0  
Reactivity Hazard: 0

#### Potential Health Effects

**Inhalation** May be harmful if inhaled. May cause respiratory tract irritation.  
**Skin** May be harmful if absorbed through skin. May cause skin irritation.  
**Eyes** May cause eye irritation.  
**Ingestion** May be harmful if swallowed.

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### 3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : 3,4-Benzpyrene  
3,4-Benzopyrene  
Benzo[def]chrysene

Formula : C<sub>20</sub>H<sub>12</sub>  
Molecular Weight : 252.31 g/mol

Component		Concentration
<b>Benzo[a]pyrene</b>		
CAS-No.	50-32-8	-
EC-No.	200-028-5	
Index-No.	601-032-00-3	

---

### 4. FIRST AID MEASURES

#### General advice

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

#### If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

#### In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

#### In case of eye contact

Flush eyes with water as a precaution.

#### If swallowed

Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

---

### 5. FIREFIGHTING MEASURES

#### Conditions of flammability

Not flammable or combustible.

#### Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

#### Special protective equipment for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

**Hazardous combustion products**

Hazardous decomposition products formed under fire conditions. - Carbon oxides

---

**6. ACCIDENTAL RELEASE MEASURES****Personal precautions**

Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

**Environmental precautions**

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

**Methods and materials for containment and cleaning up**

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

---

**7. HANDLING AND STORAGE****Precautions for safe handling**

Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Provide appropriate exhaust ventilation at places where dust is formed.

**Conditions for safe storage**

Keep container tightly closed in a dry and well-ventilated place.

---

**8. EXPOSURE CONTROLS/PERSONAL PROTECTION****Components with workplace control parameters**

Components	CAS-No.	Value	Control parameters	Basis
Remarks	Cancer Substances for which there is a Biological Exposure Index or Indices (see BEI® section), see BEI® for Polycyclic Aromatic Hydrocarbons (PAHs) Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen: Human data are accepted as adequate in quality but are conflicting or insufficient to classify the agent as a confirmed human carcinogen; OR, the agent is carcinogenic in experimental animals at dose(s), by route(s) of exposure, at site(s), of histologic type(s), or by mechanism(s) considered relevant to worker exposure. The A2 is used primarily when there is limited evidence of carcinogenicity in humans and sufficient evidence of carcinogenicity in experimental animals with relevance to humans.			
Benzo[a]pyrene	50-32-8	TWA	0.2 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.2 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	0.2 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	0.2 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants

**Personal protective equipment****Respiratory protection**

Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

**Hand protection**

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

**Eye protection**

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

**Skin and body protection**

Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

**Hygiene measures**

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

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**9. PHYSICAL AND CHEMICAL PROPERTIES****Appearance**

Form	solid
Colour	no data available

**Safety data**

pH	no data available
Melting point/freezing point	Melting point/range: 177 - 180 °C (351 - 356 °F) - lit.
Boiling point	495 °C (923 °F) - lit.
Flash point	no data available
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	1.35 g/cm <sup>3</sup>
Water solubility	no data available
Partition coefficient: n-octanol/water	log Pow: 5.97
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

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**10. STABILITY AND REACTIVITY****Chemical stability**

Stable under recommended storage conditions.

**Possibility of hazardous reactions**

no data available

**Conditions to avoid**

no data available

**Materials to avoid**

Strong oxidizing agents

**Hazardous decomposition products**

Hazardous decomposition products formed under fire conditions. - Carbon oxides

Other decomposition products - no data available

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**11. TOXICOLOGICAL INFORMATION****Acute toxicity****Oral LD50**

no data available

**Inhalation LC50**

no data available

**Dermal LD50**

no data available

**Other information on acute toxicity**

LD50 Subcutaneous - rat - 50 mg/kg

**Skin corrosion/irritation**

Skin - mouse - Mild skin irritation

**Serious eye damage/eye irritation**

no data available

**Respiratory or skin sensitization**

Chronic exposure may cause dermatitis.

May cause sensitization by inhalation.

**Germ cell mutagenicity**

May alter genetic material.

In vivo tests showed mutagenic effects

**Carcinogenicity**

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC: 1 - Group 1: Carcinogenic to humans (Benzo[a]pyrene)

NTP: Reasonably anticipated to be human carcinogens. (Benzo[a]pyrene)

Reasonably anticipated to be a human carcinogen (Benzo[a]pyrene)

**Reproductive toxicity**

May cause reproductive disorders.

**Teratogenicity**

May cause congenital malformation in the fetus.

Presumed human reproductive toxicant

**Specific target organ toxicity - single exposure (Globally Harmonized System)**

no data available

**Specific target organ toxicity - repeated exposure (Globally Harmonized System)**

no data available

**Aspiration hazard**

no data available

**Potential health effects****Inhalation**

May be harmful if inhaled. May cause respiratory tract irritation.

**Ingestion**

May be harmful if swallowed.

**Skin**

May be harmful if absorbed through skin. May cause skin irritation.

**Eyes** May cause eye irritation.

**Signs and Symptoms of Exposure**

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting

**Synergistic effects**

no data available

**Additional Information**

RTECS: DJ3675000

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## 12. ECOLOGICAL INFORMATION

**Toxicity**

Toxicity to daphnia and other aquatic invertebrates. EC50 - Daphnia magna (Water flea) - 0.25 mg/l - 48 h

Toxicity to algae EC50 - Pseudokirchneriella subcapitata (green algae) - 0.02 mg/l - 72 h

**Persistence and degradability**

no data available

**Bioaccumulative potential**

Bioaccumulation Lepomis macrochirus (Bluegill) - 48 h  
Bioconcentration factor (BCF): 3,208

**Mobility in soil**

no data available

**PBT and vPvB assessment**

no data available

**Other adverse effects**

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life with long lasting effects.

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## 13. DISPOSAL CONSIDERATIONS

**Product**

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

**Contaminated packaging**

Dispose of as unused product.

---

## 14. TRANSPORT INFORMATION

**DOT (US)**

UN number: 3077 Class: 9 Packing group: III  
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Benzo[a]pyrene)  
Reportable Quantity (RQ): 1 lbs  
Marine pollutant: No  
Poison Inhalation Hazard: No

**IMDG**

UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F  
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Benzo[a]pyrene)  
Marine pollutant: No

**IATA**

UN number: 3077 Class: 9 Packing group: III  
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Benzo[a]pyrene)

**Further information**

EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

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**15. REGULATORY INFORMATION****OSHA Hazards**

Carcinogen, Respiratory sensitiser, Teratogen, Reproductive hazard, Mutagen

**SARA 302 Components**

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

**SARA 313 Components**

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Benzo[a]pyrene	50-32-8	2007-03-01

**SARA 311/312 Hazards**

Acute Health Hazard, Chronic Health Hazard

**Massachusetts Right To Know Components**

	CAS-No.	Revision Date
Benzo[a]pyrene	50-32-8	2007-03-01

**Pennsylvania Right To Know Components**

	CAS-No.	Revision Date
Benzo[a]pyrene	50-32-8	2007-03-01

**New Jersey Right To Know Components**

	CAS-No.	Revision Date
Benzo[a]pyrene	50-32-8	2007-03-01

**California Prop. 65 Components**

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer.	50-32-8	1990-01-01
Benzo[a]pyrene		

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**16. OTHER INFORMATION****Further information**

Copyright 2011 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Co., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.





255 Norman.  
Lachine (Montreal), Que  
H8R 1A3

# Material Safety Data Sheet

## EMERGENCY NUMBERS:

(USA) CHEMTREC : 1(800) 424-9300 (24hrs)  
(CAN) CANUTEC : 1(613) 996-6666 (24hrs)  
(USA) Anachemia : 1(518) 297-4444  
(CAN) Anachemia : 1(514) 489-5711

WHMIS	Protective Clothing	TDG Road/Rail
WHMIS CLASS: E D-1A D-2A		TDG CLASS: 8 PIN: UN2809 PG: III

## Section I. Product Identification and Uses

Product name	MERCURY	CI#	Not available.
Chemical formula	Hg	CAS#	7439-97-6
Synonyms	Quicksilver, AC-5666, AC-5666T, 55982, 56004	Code	AC-5666
Supplier	Anachemia Canada. 255 Norman. Lachine (Montreal), Que H8R 1A3	Formula weight	200.59
		Supersedes	
Material uses	For laboratory use only.		

## Section II. Ingredients

Name	CAS #	%	TLV
1) MERCURY	7439-97-6	100	Exposure limits: ACGIH (Metallic mercury (as Hg)) TWA 0.025 mg(Hg)/m3 (Skin)

### Toxicity values of the hazardous ingredients

MERCURY:  
LD50: Not available.  
LC50: Not available.

### Section III. Physical Data

MERCURY

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<b>Physical state and appearance / Odor</b>	Silver metallic liquid. Odorless.
<b>pH (1% soln/water)</b>	Not available.
<b>Odor threshold</b>	Not applicable.
<b>Percent volatile</b>	Not available.
<b>Freezing point</b>	-38.89°C
<b>Boiling point</b>	356.9°C
<b>Specific gravity</b>	13.6 (Water = 1)
<b>Vapor density</b>	7 (Air = 1)
<b>Vapor pressure</b>	1 mm Hg @ 126°C
<b>Water/oil dist. coeff.</b>	Not applicable.
<b>Evaporation rate</b>	<<1
<b>Solubility</b>	Very slightly soluble in cold water.

### Section IV. Fire and Explosion Data

<b>Flash point</b>	Not applicable.
<b>Flammable limits</b>	Not applicable.
<b>Auto-ignition temperature</b>	Not applicable.
<b>Fire degradation products</b>	Mercury. Oxides of mercury.
<b>Fire extinguishing procedures</b>	Use extinguishing media appropriate to surrounding fire conditions. Wear adequate personal protection to prevent contact with material or its combustion products. Self contained breathing apparatus with a full facepiece operated in a pressure demand or other positive pressure mode.
<b>Fire and Explosion Hazards</b>	The sensitivity to impact is not applicable. The sensitivity to static discharge is not applicable. Emits toxic fumes under fire conditions.

### Section V. Toxicological Properties

<b>Routes of entry</b>	Inhalation and ingestion. Eye contact. Skin absorption.
<b>Effects of Acute Exposure</b>	May be fatal by ingestion, inhalation or skin absorption. Target organs: respiratory system, eyes, skin, kidney, central nervous system, reproductive system. 10 mg/m3 (MERCURY) is immediately dangerous to life or health.
<b>Eye</b>	Causes irritation or burns.
<b>Skin</b>	Causes skin irritation. May cause dermatitis. May cause allergic skin reaction. Liquid can be absorbed in toxic amounts through intact skin. See inhalation.
<b>Inhalation</b>	May cause respiratory tract inflammation and damage. Coughing, dyspnea, tachypnea, metallic taste, headache, nausea, vomiting, diarrhea, fever, bronchitis, irritability, lethargy, agitation, trembling, pneumonitis, emphysema, kidney damage, pulmonary edema. May cause nervous system disturbances. See chronic effects.
<b>Ingestion</b>	Burns in mouth, pharynx and gastrointestinal tract. May cause nausea, vomiting, abdominal pain, diarrhea, metallic taste, salivation, ulcers, hemorrhagic gastritis, and death. See inhalation.

**Effects of Chronic Overexposure**

May cause sensitization by skin contact. May cause mercurialism: central nervous system effects, headache, weakness, anorexia, depression, loss of weight, salivation, fatigue, muscle tremors, metallic taste, skin rashes, gingivitis, stomatitis, coloration of the eye lids, photophobia, pyorrhea, blue line on gums, pain, nephritis, diarrhea, anxiety, insomnia, irritability, mental troubles, peripheral neuropathy, central nervous system, nerve, brain, liver and kidney (proteinuria, hypoproteinemia, edema) damage or failure. Neurotoxic effects (insomnia, irritability, loss of memory, depression). Passes through the placental barrier in animal. Teratogen. May cause reproductive effects based on studies in laboratory animals. Carcinogenic effects: Not available. Mutagenic effects: Not available. To the best of our knowledge, the chemical, physical, and toxicity of this substance has not been fully investigated.

**Section VI. First Aid Measures****Eye contact**

Immediately flush eyes with copious quantities of water for at least 15 minutes holding lids apart to ensure flushing of the entire surface. Seek immediate medical attention.

**Skin contact**

Immediately flush skin with plenty of water and soap for at least 15 minutes while removing contaminated clothing and shoes. Seek immediate medical attention. Discard contaminated clothing and shoes.

**Inhalation**

Remove patient to fresh air. Administer approved oxygen supply if breathing is difficult. Administer artificial respiration or CPR if breathing has ceased. Seek immediate medical attention.

**Ingestion**

If conscious, wash out mouth with water. Have conscious person drink several glasses of water to dilute. Induce vomiting. Seek immediate medical attention. Never give anything by mouth to an unconscious or convulsing person.

**Section VII. Reactivity Data****Stability**

Stable. Conditions to avoid: High temperatures, sparks, open flames and all other sources of ignition, contamination, air.

**Hazardous decomp. products**

Not available.

**Incompatibility**

Metals (calcium, lithium, sodium, potassium, rubidium, nickel, copper, iron, zinc, aluminum and their alloys, etc.), acetylene, acetylenic compounds, ethylene, oxidizing agents, ammonia, mineral acids, halogens, boron diiodophosphide, nitric acid, sulfuric acid, 3-bromopropane, 3-bromopropyne, amines, perchlorates, tetracarbonylnickel, bromine, methylsilane, ethylene oxide, oxalic acid, peroxyformic acid, methyl azide, sodium carbide, nitromethane, alkalis, nitrates, chlorates, chlorine dioxide, azides, metal oxides and carbonyles.

**Reaction Products**

Corrosive to aluminum. Hazardous polymerization will not occur.

## Section VIII. Preventive Measures

MERCURY

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### Protective Clothing in case of spill and leak

Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves.

### Spill and leak

Evacuate the area. Absorb spilled mercury with specially designed mercury spill kits. Ventilate area and wash spill site after material pick up is complete. DO NOT empty into drains. DO NOT touch damaged container or spilled material.

### Waste disposal

Material in the elemental state should be recovered and either reused or recycled. According to all applicable regulations. Harmful to aquatic life at low concentrations. Can be dangerous if allowed to enter drinking water intakes. Do not contaminate domestic or irrigation water supplies, lakes, streams, ponds, or rivers.

### Storage and Handling

Store in a cool place away from heated areas, sparks, and flame. Store in a well ventilated area. Store away from incompatible materials. Do not add any other material to the container. Do not wash down the drain. Do not breathe gas/fumes/vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. Keep away from direct sunlight or strong incandescent light. Keep container tightly closed and dry. Manipulate under an adequate fume hood. Empty containers may contain a hazardous residue. Handle and open container with care. Take off immediately all contaminated clothing. This product must be manipulated by qualified personnel. Do not get in eyes, on skin, or on clothing. Wash well after use. In accordance with good storage and handling practices. Do not allow smoking and food consumption while handling. In case of accident or if you feel unwell, seek medical advice immediately (show the label when possible.).

## Section IX. Protective Measures

### Protective clothing

Splash goggles. Impervious rubber gloves, apron, coveralls, and/or other resistant protective clothing. Sufficient to protect skin. Have available and use as appropriate: face shields, rubber suits, aprons, and boots. A OSHA/MSHA jointly approved respirator is advised in the absence of proper environmental controls. If more than TLV, do not breathe vapor. Wear self-contained breathing apparatus. Do not wear contact lenses. Make eye bath and emergency shower available. Ensure that eyewash station and safety shower is proximal to the work-station location.

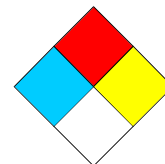
### Engineering controls

Use in a chemical fume hood to keep airborne levels below recommended exposure limits. Do not use in unventilated spaces.

## Section X. Other Information

### Special Precautions or comments

Corrosive! Highly toxic! Teratogen! Neurotoxic! Nephrotoxic! Sensitizer! Readily absorbed through skin. Possible risks of irreversible effects. Danger of cumulative effects. Do not breathe vapor. Avoid all contact with the product. Avoid prolonged or repeated exposure. Use in a chemical fume hood. Handle and open container with care. Container should be opened only by a technically qualified person.  
Synergistic materials: Not available.  
RTECS NO: OV4550000 (Mercury).



NFPA

Prepared by MSDS Department/Département de F.S..

Validated 21-Dec-2009

Telephone# (514) 489-5711

While the company believes the data set forth herein are accurate as of the date hereof, the company makes no warranty with respect thereto and expressly disclaims all liability for reliance thereon. Such data are offered solely for your consideration, investigation and verification.

# Monsanto\*

## Material Safety Data

Emergency Phone No.  
**CHEMTREC**  
**800-424-9300**

### POLYCHLORINATED BIPHENYLS (PCBs)

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#### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

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PRODUCT NAME: **POLYCHLORINATED BIPHENYLS (PCBs)**  
Aroclor® Series 1016, 1221, 1232, 1242, 1248, 1254, 1260, 1262, 1268  
Therminol® FR Series

Date : 9/2004

Chemical Family: Chlorinated Hydrocarbons  
Chemical Name: Polychlorinated biphenyls  
Synonyms: PCBs, Chlorodiphenyls, Chlorinated biphenyls

Trade Names/Common Names:

PYRANOL® and INERTEEN® are trade names for commonly used dielectric fluids that may have contained varying amounts of PCBs as well as other components including chlorinated benzenes.

ASKAREL is the generic name for a broad class of fire resistant synthetic chlorinated hydrocarbons and mixtures used as dielectric fluids that commonly contained about 30 - 70% PCBs. Some ASKAREL fluids contained 99% or greater PCBs and some contained no PCBs.

PYDRAUL® was the trade name for hydraulic fluids that, prior to 1972, may have contained varying amounts of PCBs and other components including phosphate esters.

THERMINOL® FR-0, -1, -2, and -3 were the trade names for heat transfer fluids that, prior to 1972, contained PCBs. THERMINOL® fluids without the FR designation, including current THERMINOL® products, did not and do not contain PCBs.

The product names/trade names are representative of several commonly used Monsanto products (or products formulated with Monsanto products). Other trademarked PCB products were marketed by Monsanto and other manufacturers. PCBs were also manufactured and sold by several European and Asian companies. Contact the manufacturer of the trademarked product, if not in this listing, to determine if the formulation contained PCBs.

In 1972, Monsanto restricted sales of PCBs to applications involving only closed electrical systems, (transformers and capacitors). In 1977, all manufacturing and sales were voluntarily terminated. In 1979, EPA restricted the manufacture, processing, use, and distribution of PCBs to specifically exempted and authorized activities.

FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT  
Call CHEMTREC - Day or Night - 800-424-9300 Toll free in the continental U.S., Hawaii, Puerto Rico, Canada, Alaska, or Virgin Islands. For calls originating elsewhere, call 202-483-7616 (collect calls accepted).

For additional nonemergency information, call 314-480-1677.

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## 2. COMPOSITION/INFORMATION ON INGREDIENTS

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Chemically, commercial PCBs are defined as a series of technical mixtures, consisting of many congeners, that vary from mobile, oily liquids to white crystalline solids and hard noncrystalline resins. Technical products vary in composition, in the degree of chlorination, and possibly according to batch.

The mixtures generally used contain an average of 3 atoms of chlorine per molecule (42% chlorine) to 5 atoms of chlorine per molecule (54% chlorine). They were used as components of dielectric fluids in transformers and capacitors. Prior to 1972, PCB applications included heat transfer media, hydraulic and other industrial fluids, plasticizers, carbonless copy paper, paints, inks, and adhesives.

<u>Component</u>	<u>CAS No.</u>
chlorinated biphenyl	1336-36-3
Aroclor 1016	12674-11-2
Aroclor 1221	11104-28-2
Aroclor 1232	11141-16-5
Aroclor 1242	53469-21-9
Aroclor 1248	12672-29-6
Aroclor 1254	11097-69-1
Aroclor 1260	11096-82-5
Aroclor 1262	37324-23-5
Aroclor 1268	11100-14-4

There are also CAS Numbers for individual PCB congeners and for mixtures of Aroclor® products.

PCBs are identified as hazardous chemicals under criteria of the OSHA Hazard Communication Standard (29 CFR Part 1910.1200). PCBs have been listed in the International Agency for Research on Cancer (IARC) Monographs (1987)-Group 2A and in the National Toxicology Program (NTP) Annual Report on Carcinogens (Tenth).

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## 3. HAZARDS IDENTIFICATION

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### EMERGENCY OVERVIEW

Appearance and Odor: PCB mixtures range in form and color from clear to amber liquids to white crystalline solids. They have a mild, distinctive odor and are not volatile at room temperature. Refer to Section 9 for details.

### WARNING!

CAUSES EYE IRRITATION

MAY CAUSE SKIN IRRITATION

PROCESSING AT ELEVATED TEMPERATURES MAY RELEASE VAPORS OR FUMES WHICH MAY CAUSE RESPIRATORY TRACT IRRITATION

### POTENTIAL HEALTH EFFECTS

#### Likely Routes

of Exposure: Skin contact and inhalation of heated vapors

Eye Contact: Causes moderate irritation based on worker experience.

Skin Contact: Prolonged or repeated contact may result in redness, dry skin and defatting based on human experience. A potential exists for developing chloracne. PCBs can be absorbed through intact skin.

Inhalation: Due to the low volatility of PCBs, exposure to this material in ambient conditions is not expected to produce adverse health effects. However, at elevated processing temperatures, PCBs may produce a vapor that may cause respiratory tract irritation if inhaled based on human experience.

Ingestion: No more than slightly toxic based on acute animal toxicity studies. Coughing, choking and shortness of breath may occur if liquid material is accidentally drawn into the lungs during swallowing or vomiting.

Other:

Numerous epidemiological studies of humans, both occupationally exposed and nonworker environmentally exposed populations, have not demonstrated any causal relationship between PCB exposure and chronic human illnesses such as cancer or neurological or cardiovascular effects. PCBs at high dosage can cause skin symptoms; however, these subside upon removal of the exposure source.

Refer to Section 11 for toxicological information.

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#### 4. FIRST AID MEASURES

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IF IN EYES, immediately flush with plenty of water for at least 15 minutes. If easy to do, remove any contact lenses. Get medical attention. Remove material from skin and clothing.

IF ON SKIN, immediately flush the area with plenty of water. Wash skin gently with soap as soon as it is available. Get medical attention if irritation persists.

IF INHALED, remove person to fresh air. If breathing is difficult, get medical attention.

IF SWALLOWED, do NOT induce vomiting. Rinse mouth with water. Get medical attention. Contact a Poison Control Center. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON

NOTE TO PHYSICIANS: Hot PCBs may cause thermal burn. If electrical equipment arcs between conductors, PCBs or other chlorinated hydrocarbon dielectric fluids may decompose to produce hydrochloric acid (HCl), a respiratory irritant. If large amounts are swallowed, gastric lavage may be considered.

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#### 5. FIRE FIGHTING MEASURES

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Flash Point: 284 degrees F (140 degrees C) or higher depending on the chlorination level of the Aroclor product

Fire Point: 349 degrees F (176 degrees C) or higher depending on the chlorination level of the Aroclor product

NOTE: Refer to Section 9 for individual flash points and fire points.

Extinguishing

Media: Extinguish fire using agent suitable for surrounding fire. Use dry chemical, foam, carbon dioxide or water spray. Water may be ineffective. Use water spray to keep fire-exposed containers or transformers cool.

PCBs are fire-resistant compounds. They may decompose to form CO, CO<sub>2</sub>, HCl, phenolics, aldehydes, and other toxic combustion products under severe conditions such as exposure to flame or hot surfaces.

Dielectric fluids having PCBs and chlorinated benzenes as components have been reported to produce polychlorinated dibenzo-p-dioxins (PCDDs) and furans (PCDFs) during fire situations involving electrical equipment. At temperatures in the range of 600-650 degrees C in the presence of excess oxygen, PCBs may form polychlorinated dibenzofurans (PCDFs). Laboratory studies under similar conditions have demonstrated that PCBs do not produce polychlorinated dibenzo-p-dioxins (PCDDs).

Federal regulations require all PCB transformers to be registered the U.S. Environmental Protection Agency.

If a PCB transformer is involved in a fire-related incident, the owner of the transformer may be required to report the incident. Consult and follow appropriate federal, state and local regulations.

Fire Fighting Equipment: Fire fighters and others exposed to products of combustion should wear self-contained breathing apparatus. Equipment should be thoroughly decontaminated after use.

## 6. ACCIDENTAL RELEASE MEASURES

Cleanup and disposal of liquid PCBs and other PCB items are strictly regulated by the federal government. The regulations are found at 40 CFR Part 761. Consult these regulations as well as applicable state and local regulations prior to any cleanup or disposal of PCBs, PCB items, or PCB contaminated items.

If PCBs leak or are spilled, the following steps should be taken immediately:

All nonessential personnel should leave the leak or spill area.

The area should be adequately ventilated to prevent the accumulation of vapors.

The spill/leak should be contained. Loss to sewer systems, navigable waterways, and streams should be prevented. Spills/leaks should be removed promptly by means of absorptive material, such as sawdust, vermiculite, dry sand, clay, dirt or other similar materials, or trapped and removed by pumping or other suitable means (traps, drip-pans, trays, etc.).

Personnel entering the spill or leak area should be furnished with appropriate personal protective equipment and clothing as needed. Refer to Section 8 for personal protection equipment and clothing.

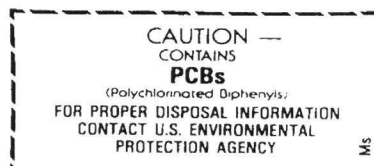
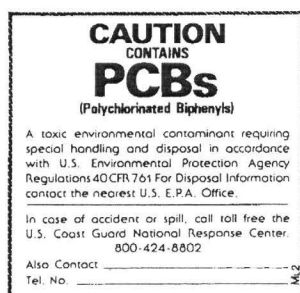
Personnel trained in emergency procedures and protected against attendant hazards should shut off sources of PCBs, clean up spills, control and repair leaks, and fight fires in PCB areas.

Refer to Section 13 for disposal information and Sections 14 and 15 for information regarding reportable quantity, and Section 7 for marking information.

## 7. HANDLING AND STORAGE

Care should be taken to prevent entry into the environment through spills, leakage, use vaporization, or disposal of liquid or containers. Avoid prolonged breathing of vapors or mists. Avoid contact with eyes or prolonged contact with skin. If skin contact occurs, remove by washing with soap and water. Following eye contact, flush with water. In case of spillage onto clothing, the clothing should be removed as soon as practical, skin washed, and clothing laundered. Comply with all federal, state, and local regulations.

Federal regulations under the Toxic Substances Control Act require PCBs, PCB items, storage areas, transformer vaults, and transport vehicles to be marked (check regulations, 40 CFR 761, for details).



**Storage:** The storage of PCB items or equipment (those containing 50 ppm or greater PCBs) and PCB waste is strictly regulated by 40 CFR Part 761. The storage time is limited, the storage area must meet physical requirements, and the area must be labeled.

**Avoid contact with eyes.**

**Wash thoroughly after handling.**

**Avoid breathing processing fumes or vapors.**

**Process using adequate ventilation.**



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## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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**Eye**

**Protection:** Wear chemical splash goggles and have eye baths available where there is significant potential for eye contact.

**Skin**

**Protection:** Wear appropriate protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine the appropriate type glove for a given application. Wear chemical goggles, face shield, and chemical resistant clothing such as a rubber apron when splashing is likely. Wash immediately if skin is contacted. Remove contaminated clothing promptly and launder before reuse. Clean protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash thoroughly after handling.

ATTENTION! Repeated or prolonged skin contact may cause chloracne in some people.

**Respiratory**

**Protection:** Avoid breathing vapor, mist, or dust. Use NIOSH/MSHA approved equipment when airborne exposure limits are exceeded. Full facepiece equipment is recommended when airborne exposure limits are exceeded and, if used, replaces the need for face shield and/or chemical splash goggles. Consult respirator manufacturer to determine the type of equipment for a given application. The respirator use limitations specified by NIOSH/MSHA or the manufacturer must be observed. High airborne concentrations may require use of self-contained breathing apparatus or supplied air respirator. Respiratory protection programs must be in compliance with 29 CFR Part 1910.134.

ATTENTION! Repeated or prolonged inhalation may cause chloracne in some people.

**Ventilation:** Provide natural or mechanical ventilation to control exposure levels below airborne exposure limits (see below). If practical, use local mechanical exhaust ventilation at sources of vapor or mist, such as open process equipment.

**Airborne Exposure Limits:**

**Product:** Chlorodiphenyl (42% chlorine)

OSHA PEL: 1 mg/m<sup>3</sup> 8-hour time-weighted average - Skin\*  
ACGIH TLV: 1 mg/m<sup>3</sup> 8-hour time-weighted average - Skin\*

**Product:** Chlorodiphenyl (54% chlorine)

OSHA PEL: 0.5 mg/m<sup>3</sup> 8-hour time-weighted average - Skin\*  
ACGIH TLV: 0.5 mg/m<sup>3</sup> 8-hour time-weighted average - Skin\*

\*For Skin notation see Threshold Limit Values for Chemical Substances and Physical Agents & Biological Exposure Indices, American Conference of Governmental Industrial Hygienists, 2003.

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**9. PHYSICAL AND CHEMICAL PROPERTIES**


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**PROPERTIES OF SELECTED AROCLORS®**

PROPERTY	1016	1221	1232	1242	1248	1254	1260
Color (APHA)	40	100	100	100	100	100	150
Physical state	mobile oil	mobile oil	mobile oil	mobile oil	mobile oil	viscous liquid	sticky resin
Stability	inert	inert	inert	inert	inert	inert	inert
Density (lb/gal 25 °C)	11.40	9.85	10.55	11.50	12.04	12.82	13.50
Specific gravity x/15.5°C	1.36-1.37 x-25°	1.18-1.19 x-25°	1.27-1.28 x-25°	1.30-1.39 x-25°	1.40-1.41 x-65°	1.49-1.50 x-65°	1.55-1.56 x-90°
Distillation range (°C)	323-356	275-320	290-325	325-366	340-375	365-390	385-420
Acidity mg KOH/g, maximum	.010	.014	.014	.015	.010	.010	.014
Fire point (°C)	none to boiling point	176	238	none to boiling point	none to boiling point	none to boiling point	none to boiling point
Flash point (°C)	170	141-150	152-154	176-180	193-196	none	none
Vapor pressure (mm Hg @ 100°F)	NA	NA	0.005	0.001	0.00037	0.00006	NA
Viscosity (Saybolt Univ. Sec. @ 100°F) (centistokes)	71-81 13-16	38-41 3.6-4.6	44-51 5.5-7.7	82-92 16-19	185-240 42-52	1800-2500 390-540	— —

NA-Not Available

NOTE: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

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**10. STABILITY AND REACTIVITY**


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Stability: PCBs are very stable, fire-resistant compounds.

Materials to Avoid: None

Hazardous Decomposition

Products: PCBs may decompose to form CO, CO<sub>2</sub> HCl, phenolics, aldehydes, and other toxic combustion products under severe conditions such as exposure to flame or hot surface.

Hazardous Polymerization: Does not occur.

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**11. TOXICOLOGICAL INFORMATION**


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Data from laboratory studies conducted by Monsanto and from the available scientific literature are summarized below. Single exposure (acute) studies indicate:

Oral - Slightly Toxic (Rat LD50 - 8.65 g/kg for 42% chlorinated; 11.9 g/kg for 54% chlorinated)

The liquid products and their vapors are moderately irritating to eye tissues. Animal experiments of varying duration and at different air concentrations show that for similar exposure conditions, the 54% chlorinated material produces more liver injury than the 42% chlorinated material.

There are literature reports that PCBs can impair reproductive functions in laboratory monkeys. Literature reports of earlier chronic feeding studies of laboratory rodents provided sufficient evidence that Aroclor 1260 could cause liver cancer when fed at high doses. Similar experiments with less chlorinated PCB products produced negative or equivocal results. A recent literature report of a chronic feeding study of Aroclor 1260, Aroclor 1254, Aroclor 1242, and Aroclor 1016 provided evidence that all four mixtures caused cancer in rodent livers.

The consistent finding in animal studies is that PCBs produce liver injury following prolonged and repeated exposure by any route, if the exposure is of sufficient degree and duration. Liver injury is produced first, and by exposures that are less than those reported to cause cancer in rodents. Therefore, exposure by all routes should be kept sufficiently low to prevent liver injury.

Numerous epidemiological studies of humans, both occupationally exposed and nonworker environmentally exposed populations, have not demonstrated any causal relationship between PCB exposure and chronic human illnesses such as cancer or neurological or cardiovascular effects. PCBs at high dosage can cause skin symptoms; however, these subside upon removal of the exposure source.

PCBs have been listed in the International Agency for Research on Cancer (IARC) Monographs (1987)-Group 2A and in the National Toxicology Program (NTP) Tenth Annual Report on Carcinogens.

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## 12. ECOLOGICAL INFORMATION

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Care should be taken to prevent entry of PCBs into the environment through spills, leakage, use, vaporization or disposal of liquid or solids. PCBs can accumulate in the environment and can adversely affect some animals and aquatic life. In general, PCBs have low solubility in water, are strongly bound to soils and sediments, and are slowly degraded by natural processes in the environment.

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## 13. DISPOSAL CONSIDERATIONS

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The disposal of PCB items or equipment (those containing 50 ppm or greater PCBs) and PCB wastes is strictly regulated by 40 CFR Part 761. For example, all wastes and residues containing PCBs (wiping cloths, absorbent material, used disposable protective gloves and clothing, etc.) should be collected, placed in proper containers, marked and disposed of in the manner prescribed by EPA regulations (40 CFR Part 761) and applicable state and local regulations.

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## 14. TRANSPORT INFORMATION

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The data provided in this section are for information only. Please apply the appropriate regulations to properly classify a shipment for transportation.

DOT Classification:	IF WEIGHT OF PCBs TO BE SHIPPED IS OVER ONE POUND, THE FOLLOWING CLASSIFICATION AND LABEL APPLY.	
DOT Label:	LIQUID:	Environmentally Hazardous Substance, liquid, n.o.s. (Contains PCB), 9, UN 3082, III
	SOLID:	Environmentally Hazardous Substance, solid, n.o.s. (Contains PCB), 9, UN 3077, III
DOT Label:	Class 9	
DOT Reportable Quantity:	One pound	
IMO Classification:	Polychlorinated Biphenyls, IMO Class 9, UN 2315, II	
	IMO Page 9034, EMS 6.1-02	
IATA/ICAO Classification:	Polychlorinated Biphenyls, 9, UN2315,II	

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## 15. REGULATORY INFORMATION

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For regulatory purposes, under the Toxic Substances Control Act, the term "PCBs" refers to a chemical substance limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances which contain such a substance (40 CFR Part 761).

TSCA Inventory: not listed.

Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370): Immediate, Delayed.  
SARA Section 313 Toxic Chemical(s): Listed-1993 (De Minimis concentration 0.1%.)

Reportable Quantity (RQ) under DOT (49 CFR), CERCLA Regulations and TSCA (40 CFR Part 761): 1 lb. (polychlorinated biphenyls) PCBs.

Release of more than 1 (one) pound of PCBs to the environment requires notification to the National Response Center (800-424-8802 or 202-426-2675).

Various state and local regulations may require immediate reporting of PCB spills and may also define spill cleanup levels. Consult your attorney or appropriate regulatory officials for information relating to spill reporting and spill cleanup.

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## 16. OTHER INFORMATION

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Reason for revision: Contact information change. Supersedes MSDS dated 7/99.

Therminol® is a registered trademark of Solutia Inc.  
Aroclor® and Pydraul® were registered trademarks of Monsanto Company  
Pyranol® is a registered trademark of General Electric Company  
Inerteen® is a registered trademark of Westinghouse Electric Corporation

FOR ADDITIONAL NONEMERGENCY INFORMATION, CONTACT:

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Suite 300  
St. Louis, MO 63105  
314-480-1677

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\* The former Monsanto Company, now known as Pharmacia Corporation, ceased manufacturing PCBs in 1977. This MSDS is provided as a convenience to former customers and users.

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